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Abstract

Research has documented that the first report an investment bank affiliated analyst issues on a newly listed stock tends to be favorable. Our analysis of 16,824 relationships between analyst teams and established listed companies during 1995-2003 indicates that analyst coverage decisions of seasoned stocks are influenced by their affiliations with investment banks and mutual funds. Controlling for market returns, stock characteristics, and a variety of performance indicators, we find analysts are more likely to issue favorable reports when the stock is held by affiliated mutual funds. The more invested by affiliated mutual funds, the more optimistic the analyst rating compared to the consensus.

JEL Classification: G20, G24, G30
Keywords: analyst coverage; analyst ratings; universal banks; mutual funds

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Introduction

Universal banks provide many services, including securities trading, sell-side research, investment banking, and asset management. Despite regulation requiring independence between these departments, there is evidence that this is not always the case. Prior literature on the relationships between investment bank and affiliated sell-side analysts documents that banks use research as a marketing tool to support their underwriting business. Initial recommendations of up to "strong buy" on an underwriter's stock-clients turn out to describe modest long-run stock performance (Michaely and Womack (1999)). In the market boom of 1999-2000, some growing evidence of conflicts of interest led authorities to strengthen regulations with regard to analyst independence from investment banking departments.

If sell-side analysts are restricted from influencing investment banking, is their research then any more independent? *Nelson's Directory of Investment Managers* reports that, in 2003, Merrill Lynch Investment Managers used Wall Street sell-side analysts 40% of the time to make portfolio decisions for $500 billion of managed assets. Morgan Stanley Investment Management Inc. used street research for 20% of its total information resources in 2003; Goldman Sachs Asset Management for 10%; Citibank Asset Management for 30%; and Credit Suisse Asset Management LLC for 40%. Research like this is usually paid for by receiving "soft dollars" into the trading department of sell-side analysts. It is intended to supplement buy-side analysis and benefit decision-making. However, since the in-house money manager is typically one of the brokerage firm's best clients, sell-side analysts may have incentives not only to provide proprietary research but also to publicly promote stocks the managers hold.

While analyst careers depend on forecasting accuracy (Stickel (1992)), full-service brokerage houses also reward analysts who tout stocks. Hong and Kubik (2003) report that, in the late 1990s,

analyst incentives were found to depend less on accuracy and more on optimism in recommendations. Ljungqvist, Marston, Starks, Wei, and Yan (2005) find that the more institutional investors hold a firm's equity, the more accurate its earnings forecasts. From 1994 to 2000, analyst recommendations on stocks highly visible to institutional investors were less likely to be influenced by investment banking or brokerage house pressures. Yet, it may be rewarding for analysts to look favorably on less visible stocks the affiliated mutual funds hold.

Extending the analysis to include in-house relations between asset management and brokerage research departments implies moving the focus from the initiation of coverage on unseasoned stocks to its continuation on seasoned stocks. The new focus reveals that securities analysts are subject to many different sources of pressure and from different directions. Analysis of the nature of these pressures would help regulators develop a more effective definition of independence criteria for sell-side analysts.

Do intra-organizational affiliations affect analyst research on seasoned firms? The evidence we collected by analyzing 16,824 connections between research departments and established listed companies says yes, in several respects. First, from 1995 through 2003, both affiliations with investment banks and mutual funds affect decisions on continuing research on seasoned stocks. Consider that when an issuing company replaces its original underwriters, affiliated analysts are much less likely to continue coverage. Krigman, Shaw, and Womack (2001) suggest that firms switch lead underwriters mainly to benefit from more reputable analyst coverage. Losing research from the former analysts clearly represents one negative side-effect of switching. Also, we find analyst teams are likely to research a stock when the affiliated mutual funds already hold it in their portfolios.

Second, from 1995 through 2001, analysts are significantly more optimistic about seasoned stocks, when they are affiliated with mutual funds. In particular, between 1999 and 2001, firms with below-the-median growth prospects or below-the-median accounting ratios receive favorable ratings, and ratings that are even better than the consensus. Analysts on the *Institutional Investor* All-American Research Team report the most optimism in covering stocks held by affiliated mutual funds. In the last years of our sample period, from 2002 to 2003, ratings become pessimistic. Overall, when mutual funds

hold a firm's stock, the affiliated analysts are 51% more likely to look favorably on that stock in their reports than unaffiliated analysts. Robustness tests confirm the causal link between affiliation with mutual funds and analyst optimism. On the contrary, analysts affiliated with investment banks assign ratings to seasoned firms as favorable as unaffiliated analysts. Similarly to James and Karceski (2005), any bias surrounding the offer of new underwritten securities fades over time.

Third, controlling for several factors including the institutional presence in a stock, our results show the more invested by affiliated mutual funds, the greater the analyst optimism. For instance, when a mutual fund increases the amount invested in a stock from the first quartile ($1.50 million) to the median ($7.29 million at the end of 2003) of the holding distribution, the probability that an affiliated analyst issues a recommendation more favorable than the consensus increases by 13%. Analyst career concerns generally combine with brokerage firm reputation to favor accuracy over optimism in the case of stocks highly visible to institutional investors (Ljungqvist et al. (2005)). This is not necessarily so when the affiliated funds invest significantly in less visible stocks. Promoting stocks with a rating of strong buy that surprises the consensus produces a median three-day abnormal return of 1.03% around the report day (a mean return of 1.70%).

To sum this up, the so-called Chinese walls between departments of a universal bank do not appear to be working perfectly. Sell-side analysts promote the seasoned stocks that affiliated mutual funds already hold.

The remainder of the paper is organized as follows. In Section I, we discuss the contribution of this paper with respect to related literature. Section II describes sampling procedures and reports the frequency of analyst coverage for our sample of seasoned stocks over a nine-year period from 1995 to 2003. In Section III, we present the univariate analysis of both affiliations with investment banks and mutual funds as possible explanations of analysts' decisions to continue favorable stock coverage. Section IV formally tests our hypothesis using multivariate survival analysis as well as a number of econometric methodologies to confirm the robustness of our results. Finally, in Section V, we draw a summary of our findings and their implications for future research.

I. Related Literature

Research has generally focused on the relations between investment banking and sell-side analysts working for an affiliated brokerage house. Analyst coverage is clearly an important service that investment bankers provide for a new equity issue, along with pricing and distribution (Dunbar (2000)). At the time of both going public and offering new shares, issuing companies want favorable and influential coverage. Investment banks are in a good position to provide this additional service.

Analysis of ratings shows that analysts affiliated with lead underwriters are favorably biased in their first recommendation on initial public offering (IPO) firms. Michaely and Womack (1999) document that in the month after the quiet period lead underwriter analysts release 50% more buy recommendations on the IPO than analysts from other brokerage firms. Bradley, Jordan, and Ritter (2003) focus on the initiation of analyst coverage after the 25-day period following an IPO. Analysts affiliated with investment banks first initiate the coverage, and during 1996 to 2000 almost always with a favorable rating. Covered firms experience a five-day abnormal return of 4.1% versus 0.1% for firms without any coverage. The more analysts initiate coverage, the higher the reported abnormal return. Rajan and Servaes (1997) and Cliff and Denis (2004) find the amount of analyst coverage following an IPO positively related to underpricing.

Michaely and Womack (1999) suggest investors expect affiliated analysts to look favorably on issuing firms. In fact, the market responds differently to the announcement of buy recommendations by lead underwriter analysts and unaffiliated analysts. Average IPO size-adjusted excess returns at the event date are 2.7% for underwriter analyst recommendations, compared to 4.4% for unaffiliated analyst recommendations. In the long run, however, firms recommended by their underwriter analysts perform significantly more poorly than firms recommended by other analysts. In the seasoned equity offering (SEO) market, Lin and McNichols (1998) report significantly more negative three-day returns upon the announcement of lead underwriter analyst hold recommendations than on the announcement of unaffiliated analyst hold recommendations. This suggests investors expect lead analysts are more likely

to recommend a hold when they really mean sell. When they control for timing, Bradley, Jordan, and Ritter (2005) find no evidence that market participants discount recommendations from affiliated analysts. The information advantage of affiliated analysts outweighs any conflicts of interest.

James and Karceski (2005) find that IPOs with poor aftermarket performance have been given higher target prices and were more likely to receive strong buy recommendations, especially from analysts affiliated with the lead underwriter. They suggest affiliated analysts provide protection for newly listed companies in the form of "booster shots" of strong coverage. The coverage has a positive effect on the firm's stock price in the first 30 days after the offer date; the average three-day abnormal return is between 3.4% and 4.4%. The "immunization" seems good for only the first two analyst reports, and lasts typically less than six months.

Relative to the existing literature, our analysis reveals more about the long-term pressures on analysts within a typical universal bank. We extend the time frame of analysis of the relations between investment banking and sell-side affiliated analysts beyond the initiation of coverage. That is, we test whether affiliation affects the choice of continuing to cover and positively rate firms that are clients of the investment bank.

Furthermore, our analysis extends the literature in including another typical affiliation within universal banks, the connection between asset management and sell-side analysts, which few authors have analyzed. Irvine, Nathan, and Simko (2004) find that affiliation with mutual funds improves analyst accuracy thanks to the information advantage. Ritter and Zhang (2005) document the relations between investment banks and affiliated funds during IPOs. In the Internet bubble period of 1999-2000, there is some evidence that the lead underwriter allocates hot IPOs to its affiliated funds to boost fund performance and attract more money inflows. Investment banks use IPO allocations for the same reasons they use the affiliated favorable research. Johnson and Marietta-Westberg (2005) show, in fact, that IPO underwriters use their institutional funds to help earn more underwriting business.

II. Data and Sampling Procedures

Our data include all analysts who covered stocks with research reports during 1994, a year characterized by no particularly sensitive financial issues or turbulence. The IBES database identifies the name of the analyst covering a given stock, the brokerage house the analyst works for, and the report date. Clarke, Khorana, Patel, and Rau (2005) document that business relationships at the brokerage firm level affect the analyst's decision to cover a stock. To analyze the persistence of the research coverage, our study focuses on the relations between the research departments of brokerage houses (hereafter called *analyst teams*) and stock-issuing firms.[1]

During 1994, 154 analyst teams covered between 1 and 976 stocks. The average team covered about 109 stocks. Our sampling procedure lets us identify 16,824 observations as *distinct* relations between analyst team i and stock j (i = 1, 2, …, 154, and j = 1, 2, …, 4,121). For example, in 1994 Goldman Sachs issued research reports on 729 stocks, while Bear Stearns covered 478 stocks. Although some companies such as Intel Corp. are covered by both brokerage houses, the two relationships, Goldman Sachs-Intel and Bear Stearns-Intel, are *distinct*, and generate two separate observations in our data set.

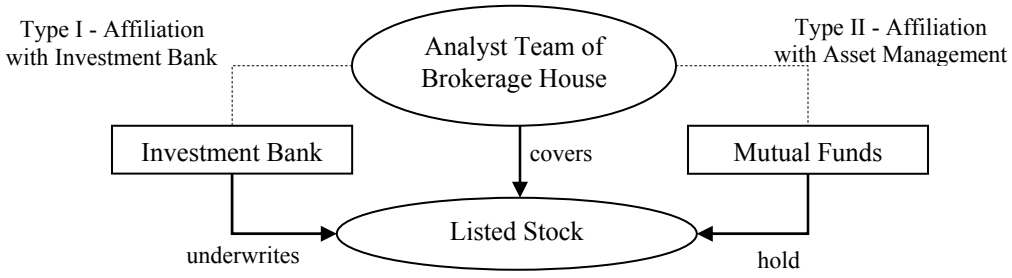
Table I reports the main descriptive statistics for the sample of stocks. 29% of the covered stocks are in the Standard & Poor's 500 index. Only 6% are traded over-the-counter or on regional exchanges. Stocks tend to be listed in the main U.S. markets, the New York Stock Exchange (NYSE), the Nasdaq, or the American Stock Exchange (Amex). NYSE-listed companies are the most represented (59%). The sample includes utility stocks and tech stocks roughly in the same proportions (7%). Utility companies are identified as in the two-digit SIC industry of 49; tech companies are defined as in the four-digit SIC codes reported in Loughran and Ritter (2004).

There are two types of affiliation in the relations between analyst team i and stock j. The first type is a common definition in the literature on analyst coverage. The second definition is less conventional.

[1] The fact that listed companies report their analyst coverage by the brokerage firm name, not often by individual analysts, also supports our approach at analyst team-level.

The first type of affiliation involves the analyst team's investment bank. That is, analyst team *i* and stock-issuing firm *j* are affiliated with investment banking if firm *j*'s securities were once underwritten by the analyst team's investment bank. In other words, there is an affiliation when the in-house investment bank was a member of the managing syndicate in the most recent SEO, debt issue or at the time of the IPO. Unaffiliated analyst teams, including teams associated with other syndicate members, become a control group, as the research shows that only managing underwriters play a significant role in the offering process and in analyst coverage. A business relationship between the issuer and other members of the syndicate is weaker or even not present (Michaely and Womack (1999); Ellis, Michaely, and O'Hara (2000); Corwin and Schultz (2005)). Data on underwriting affiliations come from the SDC database.

In our second less conventional connotation, analyst team *i* and stock *j* are affiliated with asset management when at least one of the affiliated mutual funds already holds stock *j* in its portfolio. For example, Prudential Financial manages several mutual funds. CDA/Spectrum Institutional Money Manager (13f) Holdings database aggregates the ownership data from individual mutual funds to a money manager-level on a quarterly basis. As a money manager, Prudential invests in Intel and reports its holdings at the end of the fourth quarter 1994. In this case, we regard the Prudential analyst team covering Intel as affiliated, starting from first quarter 1995 until the quarter Intel disappears from Prudential's portfolio. The following chart demonstrates the in-house relationships generating the two types of affiliations.



At the end of 1994, about 21% of firms in our sample received coverage from the analyst team

affiliated with the investment bank that had once provided underwriting services. More than one-fourth of the firms are in the portfolios of mutual funds affiliated with the brokerage firm analyst team. Just 6% of sample stocks are affiliated with both investment bank and mutual funds.

We use the quarterly coverage rate as a measure of research production. Analysts are not obliged to report on a regular basis. Our conversations with some analysts suggest that release of at least two reports a year may be expected. Empirically, the time between reports is random enough to suggest that reports are released as new information changes an analyst's valuation.

Listed companies are required to disclose financial statements on a quarterly basis. Every quarter, analyst team *i* decides to issue a report on stock *j* or not. In quarter *t*, the observed occurrence of report-issuing on stock *j* reveals the analyst team's choice of continuing coverage or breaking the silence on a particular stock, relative to the previous quarter. The quarterly coverage rate is defined as the number of reports issued divided by the total number of possible coverage events.

In the last quarter of 1994, analyst teams released reports on less than a third of the stocks. The coverage rate was 27.87% (4,689 of 16,824 potential reports). The quarterly coverage rate thus defined is the initial productivity rate of the analyst teams in our sample.

III. Univariate Analysis

The last quarter of 1994 is taken as the baseline quarter 0. We confine analysis to the set of 16,824 relationships between analyst teams and stocks over 36 consecutive quarters from the first quarter of 1995 through the fourth quarter of 2003. Because we investigate the persistence of research on seasoned stocks, no other analyst teams and/or covered stocks are further added to our sample. As a result, the number of relationships is naturally subject to right-censoring due to concentration in the brokerage industry and/or stock delisting.

Corwin and Schultz (2005) and Ljungqvist, Marston, and Wilhelm (2006) document that mergers and acquisitions in the late 1990s significantly reduced numbers in the brokerage industry. We treat analyst teams incorporated into an acquirer as inactive from the time of the acquisition. Our reasoning is that clienteles and analyst specialties may change following a merger. An example is that we eliminate

the Donaldson Lufkin & Jenrette research team in the last quarter of 2000 upon acquisition by Credit Suisse First Boston, although individual analysts might have kept working for the acquirer. As of the end of 2003, 86 analyst teams were active of the initial 154. Similarly, we eliminate stock-issuing firms that were delisted once they merged with other listed companies. As of the end of 2003, there were 1,941 stocks remaining of the initial 4,121. Over the nine-year period, the combined censoring effects result in 5,920 of 16,824 relationships still *active* as of the end of the 36th quarter.

Figure 1 plots evolution of the coverage rate for the period. Controlling for censoring in the number of relations between analyst teams and covered stocks, the quarterly coverage rate declines from about 20% to 10% over the first four years. Over 1999-2001, the production of reports on active stocks by active teams remains consistently below 10%. This low production may be explained by the uncertainty characterizing the 1999-2000 alleged market bubble and its subsequent burst in 2001. 2002 brings a renewal in research productivity. In the third quarter of 2002, the coverage rate jumps to approximately 23%, exceeding even the productivity rate recorded at the beginning of 1995. The major increase in September 2002 appears to be temporary. In 2002-2003 the coverage rate again averages around 14%, to drop to 10% in the last quarter of 2003.

How do we explain the spike in the number of reports released in third quarter 2002? After they recovered from the lows reached in the aftermath of the September 11, 2001, attacks, all major stock indices slid steadily starting in March 2002. The dollar declined against the euro, reaching a one-to-one valuation not seen since the introduction of the European currency. Over the first half of 2002, the S&P 500 fell by 14.6% for a variety of reasons: the burst of bubble conditions, a new (official NBER) recession, and uncertainty attributed to the war in Afghanistan. In the third quarter of 2002, the stock market recorded a further drop of 16.6%. The Dow Jones Industrial Average tumbled to a four-year record low on September 24, 2002, while Nasdaq prices plummeted to a six-year low.

The first changes in analyst regulations were enacted during summer 2002 when the bear market triggered concerns that investors might have been misled by biased analyst research. In July 2002, following the provisions of the Sarbanes-Oxley Act, the NASD and NYSE set new rules (Rule NASD

2711, Rule NYSE 472) restricting communications between investment banking and research functions, requiring analysts to disclose any financial interest in securities recommended, and barring analysts from personal trading. Analysts since then have been required to disclose the distribution of the ratings assigned to a given stock in the prior 12 months, along with the percentage of buy, hold, and sell recommendations assigned to all covered stocks. On August 2, 2002, the Securities and Exchange Commission (SEC) proposed the Analyst Certification Rule, finally released in April 2003. It requires that any research report disseminated include both a certification that assessments expressed accurately reflect the analyst's personal views and a report of any compensation received.

Changing market conditions and changing regulation may have prompted analysts to write more reports to try to alter previous views. Analysis of the ratings provides some insights as to this hypothesis. On a five-point scale – where 1 is the best rating (strong buy) and 5 the worst (sell) – the ratings assigned by analysts in our sample during third quarter 2002 are, on average, significantly worse than the ones in the preceding second quarter (2.60 compared to 2.27).

A. Factors Affecting the Continuation of Research Coverage

In our sample, the average stock receives three reports over a nine-year period. Some stocks receive quite constant coverage over time. For example, HSBC James Capel released reports on Louis Vuitton Moet Hennessy in 22 of the 36 quarters between 1995 and 2003. Other stocks see no coverage for long periods, but then re-gain analysts' attention (e.g., after seven years of silence, in November 2002 Bear Stearns issued a report on May Department Stores). Another group of companies consistently receives no coverage for years in a row so, at least *ex post*, we can see termination of coverage.[2]

We hypothesize that four main factors explain the persistent production of research reports in the long run: market conditions, stock characteristics, firm performance, and analyst team characteristics.

1. To represent market conditions, we summarize all the macroeconomic factors affecting volume, returns, and volatility in equity markets.

[2] Since 2002, NYSE/Nasdaq rules have required analysts to note coverage termination in their final report. Before these amendments, notifications of dropping coverage were extremely rare.

2. Stock characteristics related to firm size, listing exchange, and industry may affect the probability of receiving research coverage. For example, large established companies included in benchmark industry indices are likely to be regularly assessed by analysts.

3. The economic performance of companies is a likely determinant of coverage decisions. The better the firm's growth prospects, the higher the probability it will attract lasting analyst coverage.

4. Analyst team characteristics include size and affiliation. The size of analyst teams may affect continuing release of reports. At the end of 1994, the median team was composed of 38 analysts; interestingly, median team size more than doubles over our nine-year sample period (although this increase may be survival-biased). As research departments are seen as increasingly important in an organization, more analysts are expected to provide research coverage.

Analyst team affiliation with other banking departments is not supposed to affect decisions on continuing coverage. Even before revised analyst regulation to enforce the separation between investment banks and their research departments, professional codes of conduct prescribed independence in analyst behavior. According to the independence principle, affiliation with an investment bank is one characteristic of the analyst team that should determine neither initiation of coverage nor its termination. Nor does the independence principle imply that affiliation with mutual funds should affect research productivity.

Table II assesses the relationship between coverage rates and major characteristics of stocks and analyst teams. The characteristics and coverage rates are updated quarterly. That is, the affiliation between analyst teams and investment banks is updated by checking the managing syndicates of the 931 SEOs and 28,280 convertible and non-convertible debt issues of the sample during the nine-year period. Similarly, the affiliation with mutual funds is updated by analyzing the composition of portfolios quarter-by-quarter. The quarterly update of 13f institutional holdings advises us to lag the affiliation by one quarter. When the institutional investor reports the holding of stock j at the end of quarter t-1, the in-house research team is considered affiliated starting from quarter t. Data concerning this type of affiliation as well as portfolio composition come from multiple sources, CRSP/Compustat Merged, SDC,

and the 13f Institutional Holdings databases.

In the nine-year period, the average coverage rate of 11.93% for all active observations is taken as a reference point. Not surprisingly, stocks in the S&P 500 index obtain research coverage at an above-average rate; the same is true but to a lesser extent for stocks traded on the NYSE. Amex-listed stocks are covered even less than stocks traded over-the-counter or on regional exchanges. The average utility stock also receives less attention than tech stocks. Finally, analyst team affiliation matters. Despite what the analyst independence principle would suggest, stocks underwritten by affiliated investment banks receive above-average coverage (13.97%). Portfolio investments by mutual funds also affect affiliated analyst teams' selection of stocks covered (13.91%). Stocks benefiting from both in-house affiliations receive the highest degree of coverage of all (16.26%).

Over three subperiods, 1995-1998, 1999-2001, and 2002-2003, all stocks experienced a decline in coverage in the middle period. Interestingly, since 2002, utility stocks have received more coverage than tech stocks, although a higher coverage rate does not necessarily imply optimism in ratings. In fact, this phenomenon took place in the aftermath of the Enron scandal as major debt issues were issued to finance projects in the newly deregulated energy markets.

To analyze the relationship between analyst coverage and firm performance, we use market-book value ratio, earnings per share, and asset turnover to measure, respectively, firm growth prospects, profitability, and efficiency. The market-book value (MBV) ratio is defined as the sum of the market value of equity and the book value of long-term debt and preferred stock, divided by the book value of total assets. Asset turnover is quarterly sales divided by total assets. We also look at one of the most typical instruments of technical analysis, a moving average-based relative index, which should provide a measure of price momentum. All variables are time-varying and updated on a quarterly basis.

Figure 2 plots the median economic and financial performance in quarter t-1 of firms receiving reports in each quarter t from 1995 through 2003. Uncovered stocks represent the control group.

Analyst teams generally pick winner stocks for quarterly reports. As Panels A and B show, the stocks analyzed in analyst reports are those with higher median MBV ratios or significantly higher

quarterly earnings per share. Growth prospects and profitability drive analysts' decisions to produce reports, but efficiency in the use of assets to generate revenues seems not a decisive factor. As reported in Panel C, stocks receiving coverage have insignificantly higher median asset turnover than the control firms until 1998, when a reversal in the rankings occurs. By the end of the sample period, uncovered stocks report a significantly higher asset turnover than those covered. This evidence is consistent with less optimistic analyst research in 2002.

Finally, the choice of stocks reported on is also related to technical analysis considerations. Panel D shows that the closing prices of stocks covered during quarter *t* frequently exceed the 200-day moving average in the period. We use the 200-day moving average for three reasons. First, a long period smoothes price trends and makes results less sensitive to short-term volatility. Second, in a bull market, stock prices tend by construction to hover above their shorter moving averages when the last closing price exceeds the 200-day moving average. This controls for times the 200-day moving average is exceeded around the end of the quarter. Third, "technicians" believe that under 20% of listed stocks above their 200-day moving average predicts a sharp bullish reversal in the market. In August 2002 and January 2003, NYSE-listed stocks dropped below this threshold.

Two-sample Wilcoxon rank-sum tests reported in Table III systematically confirm the significance of the differences in median performance between stocks receiving coverage and stocks not in each quarter. The table includes three additional one-quarter lagged performance indicators: return on equity (ROE), dividend yield, and leverage ratio. ROE is calculated as quarterly earnings divided by the book value of equity. The dividend yield is defined as quarterly dividends per share divided by the closing price at the end of each quarter. The leverage ratio is long-term debt divided by the book value of equity. Subsample results indicate stocks receiving quarterly coverage perform significantly better by all indicators except for asset turnover and leverage ratios. We have noted that in the 2002-2003 period, the asset turnover ratio experiences a reversal, and the leverage ratio is significantly higher for firms receiving coverage. In other words, less efficient and more indebted firms receive preferential coverage, at least in the latter part of the sample period. Moreover, all median indicators report a decline over time, except for

the dividend yield.

B. Continuing Favorable Coverage

So far the univariate analysis does not account for the ratings assigned by analyst teams. Figure 3 displays the distribution of ratings on the five-point scale (1=strong buy; 5=sell). Bradley, Jordan, and Ritter (2003) note that analyst rating schemes are not standardized, but can vary from one firm to another, so we use the standard IBES recommendations. Analyst recommendations are mapped to one of the five standard values. If analyst team *i* releases multiple reports on a given stock *j* in quarter *t*, we use the first rating.

Figure 3 categorizes rating distributions by analyst team affiliations and subperiods. Like other researchers, we find analyst teams affiliated with investment banks that had provided issuing companies with underwriting services tend to be favorable on issuer stocks. After the Internet bubble burst, the favorable disposition weakens. In Panel A, the distribution is highly right-skewed. In the first two subperiods, the buy recommendation is both the mode and the median point. Strong buys and buys combined represent about 66% in the first subperiod, 68% during 1999 to 2001, and 45% in the last two years. In this later period, although the percentage of holds and underperforms increases considerably, there is no significant increase in the proportion of sells. Kadan, Madureira, Wang, and Zach (2005) find that, after adoption of the new analyst regulations, the likelihood of receiving an optimistic recommendation no longer depends on whether the brokerage house had underwritten an equity offering. Yet analysts, especially affiliated analysts, remain reluctant to release pessimistic recommendations. Panel B reports rating distributions for analyst teams unaffiliated with investment banks.

The distribution of ratings assigned by analyst teams affiliated with mutual funds in Panel C of Figure 3 looks identical to the distribution in Panel A. Also, in Panel D rating distributions for analysts unaffiliated with mutual funds look similar to the ones in Panel B. This similarity cannot be explained by overlaps between the two groups of affiliated analyst teams; only 6% of stocks are affiliated both with investment banks and mutual funds as of the end of 1994, and this proportion declines over time.

To examine analyst ratings, we control for accounting performance of the covered firms. Each

rating is divided by the consensus, defined as the average rating assigned by all analysts to stock *j* in quarter *t*. The quarterly consensus is obtained from IBES as a partially exogenous variable, considering all the ratings assigned in the analyst industry, including initiating and already-covering analysts. As McNichols and O'Brien (1997) suggest, an initial bias in the selection of stocks explains the optimism in the first rating as research coverage is initiated by analysts. Other authors also document that the selection bias is particularly strong when analysts are affiliated with investment banks. Because our sample includes only already-covering analyst teams, the IBES consensus results are on average more favorable than our sample rating, 2.19 compared to 2.27.

Scaling all ratings by consensus facilitates comparison of ratings for stocks covered by different groups of analyst teams. We distinguish between *relative* and *absolute* favorable recommendations; that is, affiliated analyst teams may be relatively more favorable than unaffiliated. We measure the relative optimism or favorability categorized by affiliation by a *t*-test of the difference between mean ratings. Affiliated analysts may not only issue more favorable reports than unaffiliated analysts, but also more favorable reports than the rest of the industry. On a five-point scale where five is the worst rating, a lower-than-one value of the rating divided by the consensus means that analysts are absolutely favorable on stock *j*. A value equal to one indicates that the analyst team confirms the general consensus with its recommendation.

Table IV reports the average rating divided by the consensus over the three subperiods. Ratings are categorized by performance indicators. The market-book value ratio, earnings per share, asset turnover, return on equity, dividend yield, and leverage ratio are one-quarter lagged. A performance indicator is regarded as high when it exceeds the median quarterly value. Panel A describes analysts affiliated with investment banks. Their recommendations are relatively more favorable than unaffiliated analyst recommendations, especially between 1995 and 1998. For instance, highly leveraged firms or those with below-the-median dividend yield receive a significantly higher average rating from affiliated analyst teams than from others, although a less favorable rating than the general consensus. In the middle period, the difference in behavior by affiliation with investment bank generates weaker *p*-values. Finally,

in the last two years of our sample period, there is no appreciable difference.

James and Karceski (2005) report that affiliated individual analysts modify their overly positive recommendations starting from the third report following the public offering. We also find that analyst teams affiliated with investment banks are not strongly biased in continuing research on seasoned equities. In any case, if there ever were a bias in their recommendations, it definitely disappears in the last period when new regulations on conflicts of interest between research and investment banking were established and the top-ten investment firms agreed to settle enforcement actions in April 2003.

Panel B of Table IV reports average ratings by affiliation with mutual funds. Controlling for firm performance, an affiliation with a mutual fund significantly affects average analyst team ratings. Over 1995-1998, stocks in affiliated mutual fund portfolios significantly and unconditionally receive better recommendations. In other words, analyst teams following seasoned stocks that are held by the affiliated mutual funds are relatively more favorable (if still worse than the consensus). In the 1999-2001 subperiod, the affiliated analysts results are significantly favorable toward companies reporting less-than-brilliant accounting performance. Firms with below-the-median market-book value, earnings per share, asset turnover, return on equity or firms that were highly leveraged are assigned better ratings, even more favorable than the overall consensus. Over the 2002-2003 period, the disposition of teams affiliated with mutual funds becomes less favorable, although the difference fails to be statistically significant.

What would motivate analyst teams to issue favorable ratings on stocks held by affiliated institutional investors? We argue that team-level incentives may exacerbate individual-level motivations. First, an individual analyst working for a sell-side team may want to please the affiliated mutual funds. It has been suggested that analysts are particularly interested in the annual ranking published by *Institutional Investor* (I.I.) in October each year. Since 1972, I.I. has conducted an annual survey of major money management institutions to identify analysts who have performed the best in their research sectors during the previous year. The top-four analysts are termed *All-American Research* stars, or simply, all-stars. Recognition of this sort seems to have economic consequences. According to *Fortune* and the *Wall Street Journal,* standing in the annual I.I. poll is a major factor in determining analyst

compensation.[3] Although no compensation scheme is officially available to confirm this hypothesis, researchers have documented that all-stars experience the highest turnover in the industry (Clarke, Dunbar, and Kahle (2003)). Bonuses from their employers or salary raises offered by a new employer may represent a strong incentive to look favorably on stocks already held by mutual funds, especially for affiliated analysts. Tipping institutional investors prior to the release of analyst buy and strong buy recommendations may be another related practice (Irvine, Lipson, and Puckett (2004)).

Second, brokerage firms may have a complementary interest in encouraging optimism at an individual analyst-level. Analyst team reputation depends on the number of employed analysts selected as I.I. stars. Dunbar (2000) finds that a bank whose research team is named an I.I. leader experiences an increase in underwriting market share. An increase in trading business with affiliated mutual funds may be another positive externality for brokerage firms. This hypothesis is not testable, as we are not aware of any database identifying payers and recipients of commission fees, even on an aggregate basis (Irvine (2001)).

Table V tests whether all star-analysts issue favorable reports on stocks held by affiliated institutional investors. In this case, the sample covers only continuing reports by all-stars, about 20% of the initial sample. Throughout the nine-year period, all-star analysts report significantly favorably on firms in which affiliated mutual funds are investing. In the first subperiod between 1995 and 1998, the average rating divided by the consensus is 1.03 (compared to 1.06 when all-stars are covering unaffiliated stocks). The relative optimism is directed mostly to firms with above-the-median performance, but all ratings assigned to affiliated stocks by all-stars are, on average, worse than the consensus. In 1999-2001, all-star analysts are absolutely more favorable than the consensus on stocks held by affiliated institutional investors, whatever the performance indicators. Both good and poor performers are absolutely favored.

[3] "Today analysts are hired not only to research companies and to select stocks. They are also expected to get out there and sell their research to big institutional clients, which then demand a great deal of their time and attention" (*Fortune*, October 1, 1990, p. 195). The *Wall Street Journal* (October 29, 1991, p. C1) reports the words of one research director: "Most of the guys know that they'll be visiting for the I.I. in the spring," that is, making annual pilgrimages to see clients and implicitly lobbying for I.I. votes. "I'm a lonely guy in March and April," shortly before the balloting, he says, because all his analysts are out on the road.

In the last period, the favorable disposition is once more only relative, and differences are generally not statistically significant. Finally, a comparison of Table V and Panel B of Table IV indicates all-star analysts are the group that gives the most positive ratings during 1999-2001, when they cover stocks held by affiliated mutual funds (i.e., 0.97 compared to an overall mean of 1.00).

If enhancing trading business with affiliated mutual funds drives the favorable disposition of analyst teams, we would expect that the more invested in a given stock, the more inflated the rating. Table VI tests this hypothesis. Investment is the invested dollar amount, i.e., the number of shares held by the affiliated institutional investor multiplied by the stock price as of the end of the quarter. All types of shares, both voting and non-voting, are considered to determine quarterly holdings. Also, the amount invested in a firm's equity is lagged by one quarter so that we can see whether investment size affects the ratings subsequently assigned by affiliated analyst teams, and not vice versa. At the end of 1994 affiliated institutional investors had invested $1.85 million in the median stock. The median amount invested roughly quadruples over the sample period to $7.29 million by the end of 2003.

Panel A of Table VI reports average subperiod rating (divided by the consensus) assigned by analyst teams affiliated with mutual funds as amount invested increases. From the first third (small investment tercile) to the highest third (large investment tercile), stocks generally receive higher average ratings with different levels of significance in the *t*-test of differences between means. Over 1999-2001, analyst teams assign ratings higher than the consensus to stocks largely held by affiliated investors. The relationship between holding size and positive ratings is generally monotonic, although the *t*-tests for differences in means between the highest and the lowest third are not statistically significant, except for the last subperiod. Panel B of Table VI focuses on all-star analysts. They seem less favorably disposed toward stocks held in smaller amounts by the affiliated mutual funds, and more favorably toward stocks held in larger amounts. The statistical significance of the *t*-tests increases, and the null hypothesis of no difference can now be rejected with a *p*-value between zero and 5%. This represents some evidence that all-star analysts may consistently issue optimistic recommendations on stocks that figure prominently in the portfolios of affiliated mutual funds.

C. Continuing Influential Coverage

While affiliations with both investment banks and institutional investors affect analyst team decisions to continue covering a stock, the second type of affiliation appears to be considerably more relevant. When analyst teams (and especially all-star analysts) report on stocks held by affiliated mutual funds, their average ratings are more favorable. During the bubble and then its subsequent burst, the ratings assigned to these stocks are even better than the general consensus.

Is this favorable disposition influential? In other words, is there any impact on stock price around the day reports are released by affiliated research teams? Table VII answers these questions. We use Eventus® for Cross-Sectional Analysis to determine the three-day abnormal returns for each stock that receives coverage. Day 0 marks the report date. Market-adjusted returns are determined using the CRSP equally weighted NYSE/Amex/Nasdaq index. To control for dependence of returns, we choose a 255-trading day estimation period starting 46 days before the event date. We categorize the median three-day abnormal returns as an effect of the rating assigned. As we saw in Figure 3, underperform and sell ratings represent such low percentages that it would not be informative to report them separately.

Michaely and Womack (1999) suggest that investors expect affiliated analysts to look favorably on issuing firms, and market participants do in fact discount the announcement of buy recommendations by lead underwriter analysts. Lin and McNichols (1998) report significantly more negative three-day returns on the announcement of lead underwriter analyst hold recommendations than on unaffiliated analyst hold recommendations in the SEO market. This suggests investors expect lead underwriter analysts are more likely to recommend a hold when they really mean sell. To control for market expectations, we also categorize by rating position relative to the consensus.

Surprising the market with extremely positive or extremely negative ratings is informative when analyst teams are affiliated with mutual funds. However, markets react significantly more to good news reported by these analysts. The median price impact of a strong buy assigned by analysts affiliated with mutual funds is 1.03% (the mean is 1.70%). This abnormal return is significantly higher than the change reported by stocks receiving strong buys from unaffiliated analyst teams, 0.68% (the mean is 1.29%). A

hold recommendation is generally considered bad news. When analyst teams affiliated with mutual funds issue a negative rating that is less favorable than the consensus, stocks display a slightly more negative abnormal return than stocks rated that way by unaffiliated analysts (the difference is significant at the 3% level). In a result different from that for analyst teams affiliated with investment banks, a rating of hold here does not mean sell, but rather underperform.

IV. Multivariate Analysis

In quarter *t*, each analyst team *i* decides either to release a report or to be silent on stock *j*. This choice is not independent of choices made previously. Relative to the previous quarter *t*-1, in quarter *t* analyst teams select one of four observable outcomes or behaviors: issuing another research report, switching to silence (pausing in coverage), continuing to be silent, or breaking the silence with a new report. We define the choice of covering a stock with at least one report as a failure event sampled at a quarterly frequency. Consequently, our study of the decision to continue research coverage is framed as a multiple failure-time analysis, also called multivariate survival analysis.

A. Multivariate Survival Analysis

Recurrent event data are frequently encountered in biomedical and economics investigations. They naturally arise from time-to-occurrence studies when either two or more failure events may occur for each individual observation unit or subject. In our study, the subject is a unique pair of analyst team *i* and stock *j*, and the "failure" consists of issuing a report in quarter *t*. We treat the failures according to a conditional risk set model (Prentice, Williams, and Peterson, 1981): A subject is not at risk of a second event until the first event has occurred, and so on. Thus, the conditional risk set at time *t* for the event *n* concerns only all subjects under observation that have experienced event *n*-1. Formally, let Z(*t*) denote the vector of covariates at time $t \geq 0$, and N(*t*) the number of failures prior to time *t*. The counting process for N(*t*) is described by a random variable, assumed to be continuous. The hazard or intensity function $\lambda(t)$ is defined as the instantaneous rate of failure at time *t*, given the covariates and counting processes at time *t*:

$$\lambda\{t \mid N(t), Z(t)\} = \lim_{\Delta t \to 0} Pr\{t \leq T_{n(t)+1} < t + \Delta t \mid N(t), Z(t)\} / \Delta t$$

Intuitively, this is analogous to an instantaneous probability of providing coverage, conditional on the history of decisions on whether to issue reports. In practice, we estimate a Cox proportional hazard model of the form: $\lambda\{t \mid Z(t)\} = \lambda_0(t)\exp[\ \beta' Z_t\ ]$, where $\lambda\{\cdot\}$ is called the hazard function, and $\lambda_0\{\cdot\}$ is a baseline hazard that describes the probability of no reports being issued when all the explanatory variables are set to zero. We estimate the baseline hazard non-parametrically and the vector β illustrating the impact of the explanatory variables in Z_t by maximum likelihood. The non-parametric data-driven nature of the estimate of $\lambda_0\{\cdot\}$ makes empirical results considerably robust.

By construction, our sample consists of analyst teams covering stocks in 1994. The last quarter of 1994 marks date 0, and data are left-censored by construction. We count the initial failure that is common to all stocks in our sample as a zero event. The counting process ranges then from zero to 22 (the maximum number of reports written across all stocks) failure events over 36 quarters. Time-varying covariates for the probability of continuing the coverage are:

$\lambda\{t/N(t), Z(\textit{Market Return}_t, \textit{S\&P500 component}_t \textit{ dummy}, \textit{Nasdaq-Listed}_t \textit{ dummy}, \textit{Amex-Listed}_t \textit{ dummy}, \textit{Other Exchanges}_t \textit{ dummy}, \textit{Utility}_t \textit{ dummy}, \textit{Tech}_t \textit{ dummy}, \textit{LnAssets}_{t-1}, \textit{Market-Book Value Ratio}_{t-1}, \textit{EPS}_{t-1}, \textit{Asset Turnover Ratio}_{t-1}, \textit{ROE}_{t-1}, \textit{Dividend Yield}_{t-1}, \textit{Leverage Ratio}_{t-1}, \textit{Price Exceeding 200-Day Moving Average}_t \textit{ dummy}, \textit{SEO}_t \textit{ dummy}, \textit{Analyst Team Size}_t, \textit{Affiliation with Investment Bank}_t \textit{ dummy}, \textit{Switch of Investment Bank}_t \textit{ dummy}, \textit{Affiliation with Mutual Funds}_{t-1} \textit{ dummy})\}$

The first seven covariates relate to market conditions and firm characteristics. MARKET RETURN is determined by using the CRSP value-weighted NYSE/Amex/Nasdaq index. S&P500 COMPONENT is a dummy equal to one when the stock is included in the Standard & Poor's 500 at the end of each quarter. NASDAQ-LISTED, AMEX-LISTED, and OTHER EXCHANGES are dummies for the listing on the Nasdaq, Amex, and regional exchanges. UTILITY and TECH are dummies equal to one when companies operate, respectively, in the two-digit SIC industry 49, and in the four-digit SIC codes specified in Loughran and Ritter (2004).

To avoid a look-ahead bias, all accounting indicators refer to the prior quarter, *t*-1. LNASSETS is the natural logarithm of total assets. MARKET-BOOK VALUE RATIO is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by the book value of

total assets. ASSET TURNOVER RATIO is quarterly sales divided by total assets. ROE is quarterly earnings divided by the book value of equity. DIVIDEND YIELD is quarterly dividends per share divided by the closing price at the end of the quarter. LEVERAGE RATIO is long-term debt divided by the book value of equity. PRICE EXCEEDING 200-DAY MOVING AVERAGE, equal to one when the daily price happens to exceed the 200-day arithmetic moving average in quarter *t,* is intended to capture momentum in the decision to research a firm. SEO is a dummy variable equal to one when the company makes a new equity offering in quarter *t*.

To account for analyst team characteristics, ANALYST TEAM SIZE is defined as the IBES number of analysts working for a research department. Consider that analyst team size can also be regarded as a proxy of the research department reputation. AFFILIATION WITH INVESTMENT BANK has a value of one when the analyst team is affiliated with an investment bank in the managing syndicate for the stock covered. SWITCH OF INVESTMENT BANK is equal to one when the issuing firm switches to a new investment bank as a member of the managing syndicate for new securities. This dummy variable marks the end to the firm's relationship with an investment bank that was used during a prior equity or debt issue. AFFILIATION WITH MUTUAL FUNDS has a value of one when the analyst team is affiliated with mutual funds holding, in quarter *t*-1, the stock covered.

Table VIII reports the coefficients for the Cox regression model. Lin and Wei's (1989) heteroscedasticity-robust *z*-statistics are reported in parentheses. Stratifying by failure order allows us to explain the probability that analyst teams will continue issuing reports on stocks. Regression 6 confirms the results of the univariate analysis. Stocks in the S&P 500 index, or listed on the NYSE, and reporting good accounting and financial performance are consistently covered over time. For instance, once we account for the persistence in research coverage, the coefficient of ASSET TURNOVER RATIO is positive and significant as expected. Firm size in terms of book value of assets is inversely associated with the probability the stock will be followed. An analyst team's choice of covering a stock is also affected by price momentum and an SEO.

The last three regressors in specification 6 are directly useful in testing the hypothesis of interest.

All these estimated coefficients are statistically significant. The first variable, expressing affiliation between analyst team and investment bank, positively affects analysts' decision to continue providing research on a stock. Although hazard ratios are not reported in Table VIII, they support a clearer interpretation than the coefficients. In fact, when an issuer selects an investment bank different from its original underwriter to manage an offering of new securities, the probability that the original underwriter will continue reporting on the stock declines by 26%. Krigman, Shaw, and Womack (2001) suggest that one reason companies change to a new underwriter for managing an SEO is to get higher-quality research coverage. The flip side of the coin seems to be that, once an investment bank is no longer an underwriter, the affiliated analyst team has no incentive to maintain continuous coverage on the stock. Finally, the mutual fund affiliation also drives the decision to continue covering a stock. When affiliated mutual funds have been investing in the equity of a certain company in quarter t-1, the probability that stock will be covered in quarter t rises by 21%.

We also estimate a number of Cox regression models that define the "failure" event as the decision of an analyst team to issue at time t a recommendation that is better than the quarterly consensus. Intuitively, this would be a model for the conditional probability of research teams to continue to assign favorable ratings. The probability of being (absolutely) favorable toward a stock is explained by the same covariates related to market conditions, firm characteristics, accounting and financial performance, and research team features. In Table IX we do not stratify the estimates in the first seven models. That is, for the purposes of these seven models, we assume time series independence in the ratings analysts assign over time. Regression 8 in that table uses the stratification option to capture potential persistence in the decision to issue favorable recommendations.

In the first four regressions of Table IX all coefficients related to market conditions, firm characteristics and performance indicators have the expected signs and are significant, except for dividend yield and leverage ratio. The larger the covered company, the less likely it is to receive a rating better than the consensus. Utility stocks appear to be under-rated, while tech stocks attract very favorable ratings. Some performance indicators drive analyst team optimism. The higher the earnings per share

and asset turnover ratios, the more favorable the coverage.

Once we include analyst team characteristics in Regression 5, both affiliation dummies have positive and significant coefficients. When mutual funds hold a stock, the affiliated analyst team is 51% more likely to look favorably on that stock-issuing firm in its reports than unaffiliated teams (32% more likely to continue looking favorably on that firm).

What drives the optimism of the analyst team affiliated with mutual funds? Does the investment size by mutual funds affect affiliated analyst optimism? The answer to these questions is found in Regression model 6. This model focuses on the subsample of relationships between analyst team *i* and stock *j* characterized by affiliation with mutual funds at time *t*-1. In particular, this model replaces the AFFILIATION WITH MUTUAL FUNDS dummy with three variables for the investment size: HOLDINGS BY AFFILIATED MUTUAL FUNDS, WEIGHT IN AFFILIATED MUTUAL FUNDS and LN(MONEY INVESTED BY AFFILIATED MUTUAL FUNDS). HOLDINGS BY AFFILIATED MUTUAL FUNDS are defined as the percent ratio between shares held by affiliated mutual funds at the end of the quarter *t*-1 divided by all shares outstanding. WEIGHT IN AFFILIATED MUTUAL FUNDS is the percentage of the dollar amount invested in stock *j* by the affiliated money manager divided by all 13f holdings in quarter *t*-1. LN(MONEY INVESTED BY AFFILIATED MUTUAL FUNDS) is the natural logarithm of the amount invested, in million of dollars, by affiliated mutual funds in stock *j*. Investment is defined as number of shares held multiplied by the stock price at the end of quarter *t*-1.

Also, Regression 6 includes two more variables. The first variable, ALL-STAR ANALYST, is a dummy equal to one when the analyst assigning the rating belongs to the All-American Research Team as selected by *Institutional Investor* every October. The second variable, HOLDINGS BY ALL MUTUAL FUNDS, controls for the overall presence of institutional investors in a firm's equity. All institutional investors with over $100 million assets under management must disclose their holdings on a quarterly basis. We use CDA/Spectrum to determine HOLDINGS BY ALL MUTUAL FUNDS as the percent ratio between shares held by all mutual funds at the end of quarter *t*-1 divided by all shares outstanding. Like Ljungqvist et al. (2005), we expect the presence of institutional investors to moderate analyst optimism.

Between Regression 5 and Regression 6, the coefficients of MARKET-BOOK VALUE RATIO and DIVIDEND YIELD change sign. The coefficient of ANALYST TEAM SIZE now becomes significantly negative. If the size of an analyst team is regarded as a proxy of its reputation, the larger research departments are less likely to assign extremely positive ratings compared to the consensus.

The coefficients of the last three explanatory variables in model 6 are all significant. Institutional presence does play a moderating role on analyst optimism. All-stars are particularly associated with extremely optimistic ratings. The more money invested in a firm's equity by affiliated mutual funds, the more optimistic the rating assigned. For instance, when a mutual fund increases the amount invested in a stock from the first quartile ($1.50 million) to the median ($7.29 million at the end of 2003) of the holding distribution, the probability that an affiliated analyst issues a recommendation more favorable than the consensus increases by 13% (29% from the first quartile to the third quartile, $37.14 million).

In Regression 7 we simply remove HOLDINGS BY AFFILIATED MUTUAL FUNDS and WEIGHT IN AFFILIATED MUTUAL FUNDS from the prior model. The coefficient of the logarithm of money invested does not change in magnitude or in significance. Finally, Regression 8 of Table IX, which stratifies estimates by failure order, captures the time persistence in assigning optimistic ratings. The affiliation with an investment bank again affects the decision to continue covering a stock but does not explain the continuing optimism in the ratings. On the contrary, the affiliation with mutual funds is a relevant determinant of both decisions.

B. Robustness checks

We apply a number of robustness checks to our empirical results. We want to make sure first that our findings on the importance of the mutual fund affiliation do not depend entirely on the survival analysis approach. We start by applying standard probit regression methods to the probability that analyst teams will issue a report on a given stock (see Johnson and Marietta-Westberg (2005)). While survival analysis models the conditional probability of failure, standard probit assumes independence over time. Untabulated results systematically replicate the models estimated in Table VIII. The correspondence between signs and significance levels for most variables is striking. Focusing on model 6 in Table VIII,

we find that only two coefficients out of 20 switch signs (OTHER EXCHANGES and DIVIDEND YIELD both predict a lower probability of coverage), but both of them do not directly relate to our main hypothesis. The main result remains that both types of affiliations increase the probability that a given stock will be covered, and in both cases with highly significant (robust) *z*-statistics. Interestingly, the same results are obtained either by bootstrapping the standard errors of the probit or by estimating a logistic regression. This shows that our results on the determinants of coverage do not depend on modeling persistence in behavior by survival methods.

Second, we extend probit and logit methods to the other dependent variable of interest: the probability that analyst teams may assign a rating more favorable than the consensus. Estimated coefficients are reported in the first column (All Period) of Table X. Although a few of the (robust) *z*-scores decline from the results of Table IX, this does not occur for the variables of interest. In particular, analyst teams covering stocks highly represented in the portfolios of affiliated institutional investors keep issuing recommendations significantly more favorable than the consensus. The associated estimated coefficients are significant.

Third, we expand the set of variables controlling for general business cycle conditions to include lagged values of the growth rate of standard macroeconomic indicators, such as GDP, inflation (as measured by the CPI), and the Federal funds rate. Interestingly, the macro controls are highly significant and they show the expected signs – i.e. better general conditions foster optimistic recommendations. Although the contemporaneous market return loses its significance, all other variables of interest maintain the same sign as in the first column of Table X, and most estimated coefficients hardly change value or significance level.

Fourth, one might ask how robust the results are to subsample analysis. In the context of survival (conditional) analyses, this is far from a natural question, as dividing a sample into subperiods would alter the natural structure in terms of baseline period 0 and dynamics of the phenomenon over subsequent periods. Thus we use probit techniques as they actually assume temporal independence of the failure event, defined as an analyst team assigning a rating above the consensus. Table X reports probit

estimates for the subsamples. Using shorter samples generally implies lower *z*-scores throughout, as one would expect. The signs of a few firm- or stock-specific control variables become unstable.[4] Once more our main insights turn out to be exceptionally robust over time. As an example, the positive estimated coefficient relating the probability of optimistic recommendations to the importance of a stock in the portfolio of an affiliated institutional investor does not seem to depend on any precise period. The tendency of all-stars to issue favorable ratings is higher during the bubble period, but remains significant and positive throughout.

Finally, we experiment with the random effects generalized least squares (GLS) three-way panel models that Ljungqvist et al. (2005) use in a related application. Similarly, we model a continuous indicator of analyst team optimism – defined as the ratio between the team's rating and the consensus – as a function of the combination of firm/stock characteristics as well as research team features, already specified in Table IX (columns 7-8) and Table X. We obtain two distinct sets of GLS coefficient estimates, depending on whether we model analyst team- or firm/stock-level unobserved heterogeneity.[5] A larger institutional investor presence in the firm's equity makes optimism less likely, whatever the econometric framework. Yet, both types of research team affiliations make optimism more likely.

C. Simultaneity issues

Both univariate and multivariate models and a variety of econometric techniques show that the affiliation with mutual funds is associated with a more continuing and favorable analyst coverage. However, these results do not establish a causal link, i.e. they do not prove that this affiliation causes the analysts to behave differently. In particular, one may worry that a simultaneous effect may be occurring:

[4] In some cases, the sign switches are illusory because the corresponding coefficients fail to be significant at standard size levels across estimated models. The only statistically significant case involves market returns, although the intuition is straightforward; during 2002-2003, market prices generally declined while analyst teams – under the pressure of impending new regulations – paid considerable attention to increasing the coverage provided and to reducing the bias of recommendations.

[5] Formally, $Opt^{i,j}_{t}$ is a variable measuring the optimism (relative to the consensus) of research team i on stock j at time t. The idea of random effects panel analysis is to decompose the general random error term $\varepsilon^{i,j}_{t}$ into the sum $\upsilon_i + \eta_j + \omega_t$. Each error term represents unobserved heterogeneity of optimism across research teams, stocks, and over time. Following Ljungqvist et al. (2005), we simplify the estimation problem by experimenting with either research team and time heterogeneity or firm and time heterogeneity. Provided the two sets of coefficients are similar, as it turns out to be the case in our results, choosing one or the other assumption will make little difference.

mutual funds invest in stock *j* upon the analysts' recommendations. In this case, no behavioral claim concerning the analysts' incentives might be established.[6]

To explore this hypothesis we proceed to estimate random effects panel regressions where the change (between quarter *t*-1 and quarter *t*) in the shares held by affiliated mutual funds is explained by a number of variables, including optimism of the in-house analysts in quarter *t*-1.[7] Under the null hypothesis that mutual fund affiliation causes analysts' behaviors (hence, of no simultaneity), we expect that analyst optimism will fail to significantly explain the subsequent portfolio rearrangements of in-house mutual funds.

As reported in columns 1 of Table XI, we find that past optimism of affiliated analysts fails to explain changes in the holdings. We obtain two sets of GLS coefficient estimates, depending on whether we model analyst team- or firm/stock-level unobserved heterogeneity. At both levels, change in the institutional presence is the main significant explanatory factor with a positive coefficient. We find no evidence that favorable ratings are followed by any significant change in holdings by in-house mutual funds. Overall, the evidence is at odds with a two-way simultaneous feedback system and supports instead the idea that affiliation causes analysts to behave differently and be more favorable toward stocks in portfolios of the in-house asset managers.[8]

In columns 2, we replicate the analysis using variables reflecting the contemporaneous optimism (in quarter *t*) of in-house analysts, and find identical results. This version of the model reflects the possibility that information may efficiently flow within universal banks, so that analyst optimism may be reflected in the contemporaneous portfolio behavior of the affiliated funds. Random effects regressions

[6] Unfortunately, we are unable to control whether analysts provide research (or simply tips) to mutual fund managers before they release their reports to the public. If this actually occurs, the highly regarded all-star analysts are more likely to affect portfolio rearrangements.

[7] Analyst ratings are either based on the first report or on the last available report for the quarter, in case of more reports issued by analyst team *i* on stock *j* in one quarter. In the latter case, the mutual funds have a longer time to adjust their portfolios. We find that the results are insensitive to this choice.

[8] We collect some evidence of a negative association between favorable analyst ratings and change in portfolio weight. In other words, asset managers are likely to sell stocks in the wake of favorable recommendations. The most important explanatory variables are the changes in market-book value, asset turnover, and stock price. In general, there is evidence that mutual funds prefer companies with stronger fundamentals, consistent with the findings in Field and Lowry (2005). Detailed results are available on request.

fail again to highlight any significant effect of analyst optimism on mutual fund behavior. Also, when all-star analysts release a rating more favorable than the consensus, the affiliated mutual funds will not significantly change their holdings in the covered stock.

V. Conclusion

What makes an analyst's research on seasoned stocks persistently optimistic? After studying 16,824 ties between analyst teams and established listed companies for over 36 quarters from 1995 to 2003, we find analyst decisions to continue covering seasoned stocks are influenced by their affiliations with investment banks and mutual funds. Yet analyst decisions to assign persistently optimistic ratings are influenced by their affiliation with only mutual funds. From the beginning of the sample period through 2001, we report that analysts were significantly optimistic about stocks that were held by affiliated mutual funds. In particular, in the 1999-2001 subperiod, firms with low growth prospects or accounting performance received favorable ratings, and ratings that were even better than the consensus. In the last years of our sample period, from 2002 to 2003, analyst ratings became pessimistic.

Controlling for several factors including the presence of other institutional investors, our results show the more invested in a stock by affiliated mutual funds, the higher the level of analyst optimism. We argue that, when mutual funds invest significant amounts in stocks that are less visible to other investors, the affiliated analysts have an incentive to look favorably on them. Promoting stocks with a "strong buy" that beats the consensus produces a median three-day abnormal return of 1.03% around the report day (1.70% mean return).

This study provides some insight into the competing pressures analysts face within universal banks and the related problems in developing an effective regulatory framework. While the new NASD, NYSE and SEC rules restrict communications between investment banks and affiliated research departments, our results highlight the significance of the relationship between research teams and affiliated portfolio managers. Recent news of mutual-fund trading abuses that involve large brokerage houses and their favored institutional clients provide evidence to support further research on this second linkage.

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Table I

Descriptive Statistics as of End of 1994

	End 1994
Number of Analyst Teams	154
Number of Covered Stocks	4,121
Average Number of Stocks Covered by Each Analyst Team	109.25
Proportion of Stocks in the S&P 500	29.02%
Proportion of NYSE-Listed Stocks	58.78%
Proportion of Utility Stocks	6.83%
Proportion of Tech Stocks	7.49%
Proportion of Stocks Underwritten by Affiliated Investment Bank	20.80%
Proportion of Stocks Held by Affiliated Mutual Funds	25.61%
Proportion of Stocks Both Underwritten by Affiliated Investment Bank and Held by Affiliated Mutual Funds	6.04%
Quarterly Coverage Rate	27.87%

At the end of 1994, the sample is composed by 16,824 observations as pairs of analyst team i and stock j (i = 1, 2, …, 154, j = 1, 2, …, 4,121). Each analyst team covers at least 1 stock (with a maximum of 976). Different analyst teams may cover the same stock. About 94% of the stocks are listed on the New York Stock Exchange (NYSE), the Nasdaq, or the American Stock Exchange (Amex). Remaining stocks are traded over-the-counter or on regional exchanges. Utility companies operate in the two-digit SIC industry of 49; tech companies are defined as in the four-digit SIC codes reported in Loughran and Ritter (2004). Stocks are said to be covered by an analyst team affiliated with an investment bank when the affiliated investment bank served as manager in the syndicates of the most recent seasoned equity offerings (SEOs), convertible and non-convertible debt issues or at the time of the initial public offering (IPO). Stocks are said to be covered by an analyst team affiliated with mutual funds when the affiliated mutual funds hold them in quarter t-1. The quarterly coverage rate is the total number of observations with at least one report during the fourth quarter of 1994 divided by the number of active observations at the end of that quarter. Data are from IBES, CRSP/Compustat Merged Database, and CDA/Spectrum Institutional Money Manager (13f) Holdings.

Table II

Average Quarterly Coverage Rate
Categorized by Firm Characteristics and Subperiods

		Subperiods		
	1995-2003	1995-1998	1999-2001	2002-2003
All Active Observations	11.93% N=387,980	13.41% N=226,371	8.18% N=111,213	13.57% N=50,396
Stocks in the S&P 500	14.20%	15.00%	10.63%	18.70%
NYSE-Listed Stocks	12.73%	13.94%	9.11%	15.40%
Nasdaq-Listed Stocks	11.20%	13.22%	7.27%	9.93%
Amex-Listed Stocks	7.07%	9.41%	2.60%	3.47%
Stocks Traded on Other Exchanges	8.42%	10.54%	3.64%	4.48%
Utility Stocks	9.77%	10.82%	5.60%	14.42%
Tech Stocks	12.62%	14.96%	8.38%	11.67%
Stocks Underwritten by Affiliated Investment Bank	13.97%	15.61%	9.46%	16.58%
Stocks Held by Affiliated Mutual Funds	13.91%	15.01%	9.95%	16.55%
Stocks Both Underwritten by Affiliated Investment Bank and Held by Affiliated Mutual Funds	16.26%	17.38%	11.44%	21.75%

The average quarterly coverage rate is determined as the total number of observations with at least one report during the period divided by the number of active observations at the end of that period. All firm characteristics are time-varying. About 6% of the stocks are traded over-the-counter or on regional exchanges. Utility companies operate in the two-digit SIC industry of 49; tech companies are defined as in the four-digit SIC codes reported in Loughran and Ritter (2004). Stocks are covered by an analyst team affiliated with investment banks when the affiliated investment bank served as a manager in the syndicates of the most recent SEOs, debt issues or at the time of the IPO. Stocks are covered by an analyst team affiliated with mutual funds when the affiliated mutual funds hold them in quarter *t*-1.

Table III

Median Performance Indicators of Stocks Receiving Quarterly Coverage Categorized by Subperiods

	1995-1998			1999-2001			2002-2003		
Time	Reports	No Reports	*P*-value	Reports	No Reports	*P*-value	Reports	No Reports	*P*-value
MBV Ratio	1.22	1.16	0.0000	1.22	1.03	0.0000	1.05	0.98	0.0000
EPS	$0.37	$0.33	0.0000	$0.36	$0.32	0.0000	$0.35	$0.28	0.0000
Asset Turnover	0.23	0.22	0.0000	0.20	0.21	0.0007	0.16	0.18	0.0000
Return on Equity	3.59%	3.34%	0.0000	3.51%	3.18%	0.0000	3.00%	2.68%	0.0000
Dividend Yield	0.83%	0.74%	0.0000	1.06%	0.76%	0.0000	1.32%	0.81%	0.0000
Leverage Ratio	0.46	0.47	0.0297	0.56	0.58	0.9593	0.65	0.57	0.0000
Frequency of Price Exceeding Moving Average	76.43%	71.15%	0.0000	70.11%	67.22%	0.0000	72.34%	65.39%	0.0000
No. of Active Observations	30,363	196,008		9,097	102,116		6,837	43,559	

All median values are determined in the quarter prior to the one when the report is released. MBV ratio is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by book value of total assets. Return on equity is earnings divided by the book value of equity. Dividend yield is quarterly dividends per share divided by the closing price at the end of the each quarter. Asset turnover is defined as quarterly sales divided by the total assets. Leverage ratio is long-term debt divided by book value of equity. *P*-values are for two-sample Wilcoxon rank-sum (Mann-Whitney) tests of difference between medians.

Table IV

Average Rating Divided by Consensus
by Analyst Team Affiliation and Performance Indicators

Panel A: Analyst Teams Affiliated with Investment Banks

Performance Indicators	1995-1998 Affiliated Analyst Teams	1995-1998 Other Analyst Teams	*P*-value	1999-2001 Affiliated Analyst Teams	1999-2001 Other Analyst Teams	*P*-value	2002-2003 Affiliated Analyst Teams	2002-2003 Other Analyst Teams	*P*-value
High MBV	1.06	1.07	0.1940	1.00	1.03	0.0570	1.10	1.09	0.6276
Low MBV	1.01	1.04	0.0037	1.00	1.01	0.6116	1.08	1.07	0.4462
High EPS	1.03	1.06	0.0011	1.01	1.03	0.1400	1.09	1.09	0.8419
Low EPS	1.05	1.06	0.2771	1.00	1.02	0.1729	1.09	1.07	0.4423
High Asset Turnover	1.04	1.07	0.0013	1.02	1.03	0.4641	1.07	1.07	0.7684
Low Asset Turnover	1.04	1.05	0.2290	0.99	1.02	0.0305	1.11	1.09	0.3053
High ROE	1.04	1.07	0.0012	1.01	1.04	0.0392	1.10	1.09	0.5408
Low ROE	1.04	1.05	0.7161	1.00	1.01	0.6339	1.08	1.07	0.5433
High Dividend Yield	1.03	1.04	0.0333	0.99	1.02	0.0535	1.09	1.08	0.4219
Low Dividend Yield	1.05	1.08	0.0005	1.01	1.04	0.1020	1.09	1.09	0.9765
High Leverage	1.02	1.05	0.0002	1.01	1.01	0.6368	1.09	1.08	0.7575
Low Leverage	1.06	1.07	0.7191	1.00	1.03	0.0234	1.09	1.08	0.4093
All Stocks	1.04 N=7,304	1.06 N=22,363	0.0034	1.01 N=2,083	1.03 N=6,518	0.0332	1.09 N=1,562	1.08 N=4,607	0.4637

Panel B: Analyst Teams Affiliated with Mutual Funds

Performance Indicators	1995-1998 Affiliated Analyst Teams	1995-1998 Other Analyst Teams	*P*-value	1999-2001 Affiliated Analyst Teams	1999-2001 Other Analyst Teams	*P*-value	2002-2003 Affiliated Analyst Teams	2002-2003 Other Analyst Teams	*P*-value
High MBV	1.04	1.09	0.0000	1.01	1.05	0.0004	1.10	1.07	0.0420
Low MBV	1.02	1.04	0.0111	0.99	1.03	0.0006	1.08	1.04	0.0034
High EPS	1.03	1.07	0.0000	1.01	1.04	0.0037	1.10	1.07	0.0690
Low EPS	1.03	1.06	0.0004	0.99	1.04	0.0000	1.09	1.05	0.0079
High Asset Turnover	1.03	1.08	0.0000	1.02	1.04	0.1607	1.08	1.06	0.1263
Low Asset Turnover	1.03	1.05	0.0080	0.98	1.05	0.0000	1.11	1.07	0.0034
High ROE	1.04	1.08	0.0000	1.01	1.05	0.0047	1.10	1.07	0.0700
Low ROE	1.03	1.05	0.0033	0.97	1.04	0.0000	1.09	1.05	0.0036
High Dividend Yield	1.02	1.06	0.0000	0.99	1.04	0.0000	1.09	1.06	0.0620
Low Dividend Yield	1.05	1.08	0.0008	1.01	1.05	0.0073	1.11	1.06	0.0084
High Leverage	1.02	1.05	0.0000	0.99	1.04	0.0000	1.09	1.05	0.0052
Low Leverage	1.05	1.08	0.0000	1.01	1.04	0.0031	1.09	1.06	0.0518
All Stocks	1.03 N=10,323	1.07 N=19,344	0.0000	1.00 N=4,455	1.05 N=4,146	0.0000	1.10 N=4,105	1.07 N=2,064	0.0028

Recommendations are scaled by the quarterly consensus, which is the mean rating assigned by all securities analysts covering a given stock. The recommendation score ranges from 1 (strong buy) to 5 (sell). When the same analyst team releases more than one report on a stock during the quarter *t*, the first rating is the one included. An analyst team is regarded as affiliated with the investment bank when the affiliated investment bank is in the managing syndicate for the issuing firm covered by the team. An analyst team is regarded as affiliated with a mutual fund when the affiliated mutual funds hold, in quarter *t*-1, the stock covered by the team. Performance indicators are called high when higher than the quarterly median. All performance indicators are one-quarter lagged. The *p*-values for differences within subsample means are from standard *t*-tests for difference in means.

Table V

Average Rating Assigned by All-Star Analysts
by Affiliation with Mutual Funds and Performance Indicators

Performance Indicators	1995-1998 Affiliated All-Star Analysts	1995-1998 Unaffiliated All-Star Analysts	*P*-value	1999-2001 Affiliated All-Star Analysts	1999-2001 Unaffiliated All-Star Analysts	*P*-value	2002-2003 Affiliated All-Star Analysts	2002-2003 Unaffiliated All-Star Analysts	*P*-value
High MBV	1.04	1.09	0.0003	0.99	1.09	0.0001	1.11	1.13	0.4085
Low MBV	1.01	1.03	0.1148	0.95	1.02	0.0135	1.08	1.12	0.2554
High EPS	1.03	1.06	0.0219	0.98	1.06	0.0015	1.10	1.14	0.1503
Low EPS	1.03	1.07	0.0138	0.96	1.04	0.0067	1.10	1.13	0.8300
High Asset Turnover	1.02	1.07	0.0009	0.99	1.06	0.0178	1.07	1.09	0.5362
Low Asset Turnover	1.03	1.05	0.2071	0.95	1.04	0.0006	1.13	1.17	0.1664
High ROE	1.03	1.06	0.0068	0.98	1.06	0.0019	1.09	1.11	0.4339
Low ROE	1.03	1.06	0.0665	0.95	1.03	0.0055	1.11	1.13	0.4668
High Dividend Yield	1.01	1.06	0.0009	0.97	1.03	0.0059	1.08	1.13	0.0493
Low Dividend Yield	1.05	1.06	0.3056	0.98	1.07	0.0022	1.11	1.13	0.7007
High Leverage	1.01	1.05	0.0019	0.96	1.04	0.0011	1.10	1.10	0.9552
Low Leverage	1.05	1.08	0.1038	0.98	1.06	0.0095	1.09	1.15	0.0801
All Stocks	1.03 N=2,721	1.06 N=3,347	0.0019	0.97 N=1,458	1.05 N=593	0.0000	1.10 N=1,921	1.13 N=358	0.1117

Recommendations are scaled by the quarterly consensus, which is the mean rating assigned by all securities analysts covering a given stock. The recommendation score ranges from 1 (strong buy) to 5 (sell). When the same analyst team releases more than one report on a stock during the quarter *t*, the first rating is the one included. All-star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. An all-star analyst is regarded as affiliated with the mutual funds when the affiliated mutual funds hold, in quarter *t*-1, the stock covered. Performance indicators are called high when higher than the quarterly median. The *p*-values for differences within subsample means are from standard *t*-tests for difference in means.

Table VI

Average Rating and Amounts Invested by Affiliated Mutual Funds

Panel A: All Sample

Terciles	1995-2003	Subperiods		
		1995-1998	1999-2001	2002-2003
Small Investment (1)	1.05	1.04	1.01	1.13
Medium Investment (2)	1.04	1.03	1.00	1.11
Large Investment (3)	1.03	1.03	0.99	1.07
P-value (3) – (1)	0.0130	0.3573	0.1696	0.0005

Panel B: Subsample of All-Star Analysts

Terciles	1995-2003	Subperiods		
		1995-1998	1999-2001	2002-2003
Small Investment (1)	1.07	1.05	1.01	1.18
Medium Investment (2)	1.05	1.04	0.98	1.12
Large Investment (3)	1.01	1.01	0.95	1.06
P-value (3) – (1)	0.0000	0.0414	0.0278	0.0000

Recommendations are scaled by the quarterly consensus, which is the mean rating in the research industry. The recommendation score ranges from 1 (strong buy) to 5 (sell). When the same analyst team releases more than one report on a stock during the quarter *t*, the first rating is the one included. An analyst team is regarded as affiliated with the mutual funds when the affiliated mutual funds hold in quarter *t*-1 the stock covered by the analyst team in quarter *t*. Investment is defined as the dollar amount of the shares held by the mutual funds at the end of the quarter *t*-1. *P*-values for differences within subsample means are from standard *t*-tests for difference in means. Data are from IBES, CRSP/Compustat Merged Database, and CDA/Spectrum Institutional Money Manager (13f) Holdings.

Table VII

Median Three-Day Abnormal Returns around the Report Day by Analyst Team Affiliation with Mutual Funds

	More Favorable than Consensus			Less Favorable than Consensus		
Rating	Affiliated Analyst Teams	Other Analyst Teams	*P*-value	Affiliated Analyst Teams	Other Analyst Teams	*P*-value
1 = Strong Buy	1.03% N=5,157	0.68% N=8,764	0.0000	--	--	--
2 = Buy	0.35% N=4,358	0.26% N=6,365	0.1346	0.02%* N=2,947	0.04%* N=4,839	0.8886
≥ 3 = Hold or Worse	-0.49% N=399	-0.33% N=1,454	0.3791	-0.67% N=8,921	-0.58% N=13,974	0.0308
All Ratings	0.65% N=9,914	0.43% N=16,583	0.0000	-0.51% N=11,868	-0.44% N=18,813	0.0558

Three-day market-adjusted returns are determined by using the CRSP equally weighted NYSE/Amex/Nasdaq index. Day 0 marks the report date. To control for dependence of returns, a 255-trading day estimation period starting 46 days before the event date is used. Cross-sectional abnormal returns are calculated using *Eventus*® *Software*. The *p*-values are for a two-sample Wilcoxon rank-sum (Mann-Whitney) test. All median abnormal returns are different from zero at the 1% level except those with * superscript.

Table VIII

Cox Regression for Probability that Analyst Teams Will Continue Releasing Reports

	1	2	3	4	5	6
MARKET RETURN$_t$	1.62 (41.77)			1.40 (33.45)		1.41 (33.87)
S&P500 COMPONENT$_t$ dummy		0.51 (53.59)		0.07 (5.13)		0.06 (4.30)
NASDAQ-LISTED$_t$ dummy		0.49 (44.97)		-0.06 (-4.77)		-0.06 (-4.34)
AMEX-LISTED$_t$ dummy		0.04 (0.77)		-0.27 (-4.60)		-0.24 (-4.06)
OTHER EXCHANGES$_t$ dummy		0.37 (15.79)		0.02 (0.79)		0.02 (0.89)
UTILITY$_t$ dummy		-0.09 (-4.32)		-0.05 (-2.29)		-0.03 (-1.46)
TECH$_t$ dummy		-0.07 (-4.05)		0.02 (1.30)		0.03 (1.38)
LNASSETS$_{t-1}$			-0.06 (-21.89)	-0.07 (-18.93)		-0.08 (-20.50)
MARKET-BOOK VALUE RATIO$_{t-1}$			0.02 (8.57)	0.02 (7.92)		0.01 (6.47)
EPS$_{t-1}$			0.07 (13.03)	0.06 (11.91)		0.06 (11.97)
ASSET TURNOVER RATIO$_{t-1}$			0.25 (12.42)	0.23 (11.23)		0.24 (11.24)
ROE$_{t-1}$			0.02 (2.27)	0.02 (2.35)		0.02 (2.28)
DIVIDEND YIELD$_{t-1}$			0.08 (1.64)	0.08 (1.73)		0.02 (1.21)
LEVERAGE RATIO$_{t-1}$			-0.00 (-2.21)	-0.00 (-2.32)		-0.00 (-2.34)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy			0.29 (24.13)	0.29 (23.46)		0.28 (22.85)
SEO$_t$ dummy			0.31 (8.41)	0.31 (8.43)	0.56 (13.25)	0.29 (6.81)
ANALYST TEAM SIZE $_t$					-0.00 (-2.40)	0.00 (11.70)
AFFILIATION WITH INVESTMENT BANK$_t$ dummy					0.03 (2.65)	0.07 (5.62)
SWITCH OF INVESTMENT BANK$_t$ dummy					-0.25 (-2.19)	-0.30 (-2.53)
AFFILIATION WITH MUTUAL FUNDS$_{t-1}$ dummy					0.63 (62.54)	0.19 (17.43)
Wald Chi-squared Prob > Chi-squared Number of Failures Number of Observations	1,745.12 0.0000 46,297 605,664	4,705.92 0.0000 46,297 605,664	1,634.99 0.0000 42,342 414,300	2,710.12 0.0000 42,342 414,300	4,429.73 0.0000 46,155 605,006	3,585.83 0.0000 42,205 413,675

Failure event is the release of one or more reports on stock *i* by the analyst team *j* in the quarter *t*. Analysis time is on 36 quarters, over 1995-2003, where last quarter 1994 represents time 0. Cox regression (Breslow method for ties) results are stratified by failure order. The hazard function is as follows.

$\lambda\{t/N(t), Z(\text{MARKET RETURN}_t, \text{S\&P500 COMPONENT}_t \text{ dummy}, \text{NASDAQ-LISTED}_t \text{ dummy}, \text{AMEX-LISTED}_t \text{ dummy}, \text{OTHER EXCHANGES}_t \text{ dummy}, \text{UTILITY}_t \text{ dummy}, \text{TECH}_t \text{ dummy}, \text{LNASSETS}_{t-1}, \text{MARKET-BOOK VALUE RATIO}_{t-1}, \text{EPS}_{t-1}, \text{ASSETS TURNOVER RATIO}_{t-1}, \text{ROE}_{t-1}, \text{DIVIDEND YIELD}_{t-1}, \text{LEVERAGE RATIO}_{t-1}, \text{PRICE EXCEEDING 200-DAY MOVING AVERAGE}_t \text{ dummy}, \text{SEO}_t \text{ dummy}, \text{ANALYST TEAM SIZE}_t, \text{AFFILIATION WITH INVESTMENT BANK}_t \text{ dummy}, \text{SWITCH OF INVESTMENT BANK}_t \text{ dummy}, \text{AFFILIATION WITH MUTUAL FUNDS}_{t-1} \text{ dummy})\}$

All covariates are time-varying variables. MARKET RETURN is determined by using the CRSP value-weighted NYSE/Amex/Nasdaq index. S&P500 COMPONENT is a dummy equal to one when the stock is included in the Standard and Poor's 500 at the end of each quarter. UTILITY and TECH are dummies equal to one when companies operate, respectively, in the two-digit SIC industry of 49, and in the four-digit SIC codes specified in Loughran and Ritter (2004). Performance indicators refer to the prior quarter, *t*-1. LNASSETS is the natural logarithm of total assets in million of dollars. MARKET-BOOK VALUE RATIO is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by the book value of total assets. ROE is equal to quarterly earnings divided by the book value of equity. DIVIDEND YIELD is defined as quarterly dividends per share divided by the closing price at the end of the each quarter. ASSET TURNOVER RATIO is quarterly sales divided by total assets. LEVERAGE RATIO is long-term debt divided by the book value of equity. PRICE EXCEEDING 200-DAY MOVING AVERAGE is equal to one when the daily price happens to exceed the 200-day arithmetic moving average in quarter *t*. SEO is a dummy variable equal to one when the company realizes a new equity offering in quarter *t*. ANALYST TEAM SIZE is the number of analysts in the team. AFFILIATION WITH INVESTMENT BANK has value one when the analyst team is affiliated with the investment bank serving as member of the managing syndicate for the stock covered. SWITCH OF INVESTMENT BANK is equal to one when the investment bank is no longer selected as a member of the managing syndicate for underwriting new securities. AFFILIATION WITH MUTUAL FUNDS has value one when the analyst team is affiliated with the mutual funds holding the stock covered. Lin and Wei's (1989) heteroscedasticity-adjusted *z*-statistics are in parentheses.

Table IX

Cox Regression for Probability that Analyst Teams Will Assign Favorable (Better-than-Consensus) Ratings

	1	2	3	4	5	6	7	8 stratified
MARKET RETURN$_t$	1.89 (32.12)			1.72 (27.57)	1.74 (28.10)	1.23 (12.51)	1.23 (12.52)	1.14 (11.42)
S&P500 COMPONENT$_t$ dummy		0.90 (60.67)		0.15 (6.79)	0.14 (6.00)	0.08 (2.15)	0.08 (2.15)	0.03 (0.99)
NASDAQ-LISTED$_t$ dummy		0.55 (31.90)		-0.04 (-1.90)	-0.05 (-2.58)	-0.14 (-4.18)	-0.15 (-4.22)	-0.14 (-3.97)
AMEX-LISTED$_t$ dummy		0.06 (0.63)		-0.30 (-3.06)	-0.26 (-2.58)	-0.54 (-2.34)	-0.54 (-2.35)	-0.49 (-2.11)
OTHER EXCHANGES$_t$ dummy		0.24 (6.12)		-0.09 (-2.03)	-0.10 (-2.09)	-0.08 (-0.91)	-0.08 (-0.91)	-0.09 (-1.06)
UTILITY$_t$ dummy		-0.21 (-6.41)		-0.21 (-6.23)	-0.18 (-5.32)	-0.17 (-2.97)	-0.17 (-2.96)	-0.12 (-2.08)
TECH$_t$ dummy		-0.08 (-2.73)		0.08 (2.53)	0.07 (2.32)	0.12 (2.75)	0.12 (2.74)	0.08 (1.91)
LNASSETS$_{t-1}$			0.01 (3.87)	-0.01 (-2.43)	-0.03 (-4.65)	-0.14 (-12.94)	-0.14 (-13.49)	-0.17 (-16.17)
MARKET-BOOK VALUE RATIO$_{t-1}$			0.02 (6.36)	0.01 (3.94)	0.01 (2.58)	-0.02 (-3.47)	-0.03 (-3.62)	-0.02 (-2.38)
EPS$_{t-1}$			0.06 (8.01)	0.06 (7.44)	0.06 (7.34)	0.07 (5.37)	0.07 (5.41)	0.08 (6.20)
ASSET TURNOVER RATIO$_{t-1}$			0.29 (15.59)	0.28 (14.70)	0.28 (14.85)	0.22 (6.65)	0.22 (6.61)	0.16 (3.99)
ROE$_{t-1}$			0.04 (2.20)	0.03 (2.35)	0.04 (2.36)	0.02 (2.14)	0.02 (2.13)	0.01 (1.05)
DIVIDEND YIELD$_{t-1}$			-0.27 (-0.96)	0.08 (1.45)	0.03 (0.49)	-1.91 (-2.80)	-1.89 (-2.77)	-0.22 (-0.35)
LEVERAGE RATIO$_{t-1}$			-0.01 (-1.76)	-0.01 (-1.78)	-0.01 (-1.83)	-0.00 (-1.73)	-0.00 (-1.73)	-0.00 (-1.54)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy			0.43 (21.63)	0.43 (21.11)	0.41 (20.11)	0.37 (11.44)	0.37 (11.51)	0.35 (10.90)
SEO$_t$ dummy			0.33 (5.78)	0.37 (6.33)	0.41 (6.80)	0.06 (0.53)	0.06 (0.53)	0.10 (0.86)
ANALYST TEAM SIZE$_t$					0.00 (6.53)	-0.00 (-20.32)	-0.00 (-20.67)	-0.00 (-22.32)
AFFILIATION WITH INVESTMENT BANK$_t$ dummy					0.29 (15.31)	0.14 (5.02)	0.14 (5.03)	0.00 (0.13)
SWITCH OF INVESTMENT BANK$_t$ dummy					-0.43 (-2.08)	-0.49 (-1.45)	-0.49 (-1.45)	-0.55 (-1.76)
AFFILIATION WITH MUTUAL FUNDS$_{t-1}$ dummy					0.41 (23.39)	--	--	--
HOLDINGS BY AFFILIATED MUTUAL FUNDS$_{t-1}$					--	0.00 (0.56)	--	--
WEIGHT IN AFFILIATED MUTUAL FUNDS$_{t-1}$					--	-0.01 (-0.52)	--	--
LN(MONEY INVESTED BY AFFILIATED MUTUAL FUNDS)$_{t-1}$					--	0.08 (11.95)	0.08 (13.07)	0.04 (7.44)
HOLDINGS BY ALL MUTUAL FUNDS$_{t-1}$					--	-0.01 (-21.94)	-0.01 (-22.06)	-0.02 (-24.56)
ALL-STAR ANALYST$_t$ dummy					--	2.40 (83.49)	2.40 (83.62)	2.16 (75.93)
Wald Chi-squared	1,031.38	4,924.04	1,119.83	2,041.80	3,469.52	9,042.59	9,040.39	6,572.76
Prob > Chi-squared	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of Failures	18,441	18,441	16,666	16,909	16,909	7,391	7,391	7,391
Number of Observations	605,664	605,664	405,012	414,300	413,300	126,123	126,123	126,123

Failure event is the release of a recommendation by the analyst team *j* better than the consensus on stocks *i* in quarter *t*. Analysis time is on 36 quarters, over 1995-2003, where last quarter 1994 represents time 0. Cox regression (Breslow method for ties) results are stratified by failure order.

$\lambda\{t/N(t), Z(\text{MARKET RETURN}_t, \text{S\&P500 COMPONENT}_t \text{ dummy}, \text{NASDAQ-LISTED}_t \text{ dummy}, \text{AMEX-LISTED}_t \text{ dummy}, \text{OTHER EXCHANGES}_t \text{ dummy}, \text{UTILITY}_t \text{ dummy}, \text{TECH}_t \text{ dummy}, \text{LNASSETS}_{t-1}, \text{MARKET-BOOK VALUE RATIO}_{t-1}, \text{EPS}_{t-1}, \text{ASSETS TURNOVER RATIO}_{t-1}, \text{ROE}_{t-1}, \text{DIVIDEND YIELD}_{t-1}, \text{LEVERAGE RATIO}_{t-1}, \text{PRICE EXCEEDING 200-DAY MOVING AVERAGE}_t \text{ dummy}, \text{SEO}_t \text{ dummy}, \text{ANALYST TEAM SIZE}_t, \text{AFFILIATION WITH INVESTMENT BANK}_t \text{ dummy}, \text{SWITCH OF INVESTMENT BANK}_t \text{ dummy}, \text{LN(MONEY INVESTED BY AFFILIATED MUTUAL FUNDS)}_{t-1}, \text{HOLDINGS BY ALL MUTUAL FUNDS}_{t-1}, \text{ALL-STAR ANALYST}_t \text{ dummy})\}$

All covariates are time-varying variables. MARKET RETURN is determined by using the CRSP value weighted NYSE/Amex/Nasdaq index. S&P500 COMPONENT is a dummy equal to one when the stock is included in the Standard and Poor's 500 at the end of each quarter. UTILITY and TECH are dummies equal to one when companies operate, respectively, in the two-digit SIC industry of 49, and in the four-digit SIC codes specified in Loughran and Ritter (2004). Performance indicators refer to the prior quarter, *t*-1. LNASSETS is the natural logarithm of total assets in million of dollars. MARKET-BOOK VALUE RATIO is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by the book value of total assets. ROE is equal to quarterly earnings divided by the book value of equity. DIVIDEND YIELD is defined as quarterly dividends per share divided by the closing price at the end of the each quarter. ASSET TURNOVER RATIO is defined as the quarterly sales divided by total assets. LEVERAGE RATIO is long-term debt divided by the book value of equity. SEO is a dummy variable equal to one when the company realizes a new equity offering in quarter *t*. ANALYST TEAM SIZE is the number of analysts in the team. AFFILIATION WITH INVESTMENT BANK has value one when the analyst team is affiliated with the investment bank serving as member of the managing syndicate for the stock covered. SWITCH OF INVESTMENT BANK is equal to one when the investment bank is no longer selected as a member of the managing syndicate for underwriting new securities. AFFILIATION WITH MUTUAL FUNDS has value one when the analyst team is affiliated with the mutual funds holding in quarter *t*-1 the stock covered. HOLDINGS BY AFFILIATED MUTUAL FUNDS are defined as the percent ratio between the shares held by the affiliated mutual funds at the end of the quarter *t*-1 divided by all shares outstanding. WEIGHT IN AFFILIATED MUTUAL FUNDS is the percentage of the dollar amount invested in stock *j* by the affiliated money manager divided by all 13f holdings in quarter *t*-1. LN(MONEY INVESTED BY AFFILIATED MUTUAL FUNDS)$_{t-1}$ is the natural logarithm of the dollar amount invested, in million of dollars, by affiliated mutual funds in stock *j*. Investment is determined as number of held shares multiplied by the stock price at the end of the quarter. HOLDINGS BY ALL MUTUAL FUNDS are defined as the percent ratio between the shares held by all mutual funds at the end of quarter *t*-1 divided by all shares outstanding. ALL-STAR ANALYST is a dummy equal to one when the analyst issuing the report belongs to the All-American Research Team as selected by *Institutional Investor* magazine every October. Lin and Wei's (1989) heteroscedasticity-adjusted *z*-statistics are in parentheses.

Table X

Probit for Probability that Analyst Teams Will Assign Favorable (Better-than-Consensus) Ratings by Subperiods

	All Period	1995-1998	1999-2001	2002-2003
MARKET RETURN$_t$	0.13 (1.99)	-0.15 (-1.37)	0.37 (3.37)	-1.06 (-7.78)
S&P500 COMPONENT$_t$ dummy	0.03 (1.43)	0.01 (0.32)	0.03 (0.72)	0.04 (0.78)
NASDAQ-LISTED$_t$ dummy	0.03 (1.50)	0.05 (2.15)	0.01 (0.39)	0.09 (1.82)
AMEX-LISTED$_t$ dummy	-0.02 (-0.15)	0.02 (0.16)	-0.49 (-1.38)	0.06 (0.18)
OTHER EXCHANGES$_t$ dummy	-0.12 (-2.90)	-0.08 (-1.63)	-0.42 (-3.81)	0.16 (0.91)
UTILITY$_t$ dummy	-0.02 (-0.83)	-0.01 (-0.26)	-0.04 (-0.70)	0.03 (0.45)
TECH$_t$ dummy	0.08 (3.21)	0.13 (4.10)	0.00 (0.07)	0.01 (0.17)
LNASSETS$_{t-1}$	0.00 (0.64)	0.01 (2.13)	0.01 (1.41)	0.04 (2.84)
MARKET-BOOK VALUE RATIO$_{t-1}$	-0.00 (0.15)	0.01 (2.22)	0.00 (0.07)	-0.01 (-0.77)
EPS$_{t-1}$	-0.01 (-1.13)	-0.00 (-0.30)	-0.04 (-3.67)	-0.02 (-1.70)
ASSET TURNOVER RATIO$_{t-1}$	0.06 (3.17)	0.07 (3.19)	0.00 (0.06)	0.08 (0.72)
ROE$_{t-1}$	0.01 (1.93)	0.02 (0.75)	-0.00 (-0.19)	0.12 (2.01)
DIVIDEND YIELD$_{t-1}$	-0.55 (-1.49)	0.19 (0.37)	-1.17 (-1.51)	-0.98 (-1.01)
LEVERAGE RATIO$_{t-1}$	-0.00 (-0.84)	-0.00 (-0.87)	-0.00 (-0.32)	-0.01 (-1.71)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy	0.11 (6.88)	0.11 (4.72)	0.11 (3.40)	0.04 (1.09)
SEO$_t$ dummy	0.03 (0.57)	0.04 (0.51)	0.10 (0.87)	-0.03 (-0.25)
ANALYST TEAM SIZE$_t$	-0.00 (-4.18)	-0.00 (-3.93)	-0.00 (-0.25)	0.00 (3.39)
AFFILIATION WITH INVESTMENT BANK$_t$ dummy	0.09 (6.12)	0.09 (4.41)	0.09 (3.08)	0.13 (3.42)
SWITCH OF INVESTMENT BANK$_t$ dummy	-0.14 (-0.77)	0.01 (0.02)	-0.17 (-0.49)	-0.36 (-0.91)
LN(MONEY INVESTED BY AFFILIATED MUTUAL FUNDS)$_{t-1}$	0.04 (11.56)	0.03 (6.64)	0.04 (6.58)	0.03 (3.67)
HOLDINGS BY ALL MUTUAL FUNDS$_{t-1}$	-0.00 (-5.53)	0.00 (0.10)	-0.00 (-2.93)	-0.00 (-1.26)
ALL-STAR ANALYST$_t$ dummy	1.56 (84.79)	1.50 (56.17)	1.82 (49.09)	1.37 (35.05)
Wald Chi-squared	8,037.8	3,431.9	2,789.4	1,760.0
Prob > Chi-squared	0.0000	0.0000	0.0000	0.0000
Maximized pseudo log-likelihood	-24,241	-13,511	-6,334	-3,626
Pseudo R^2	0.1369	0.1095	0.1802	0.1964
Number of Observations	126,123	62,978	40,661	22,484

Table XI

Random Effects GLS of Favorable (Better-than-Consensus) Ratings on the Change in Holdings by Affiliated Mutual Funds

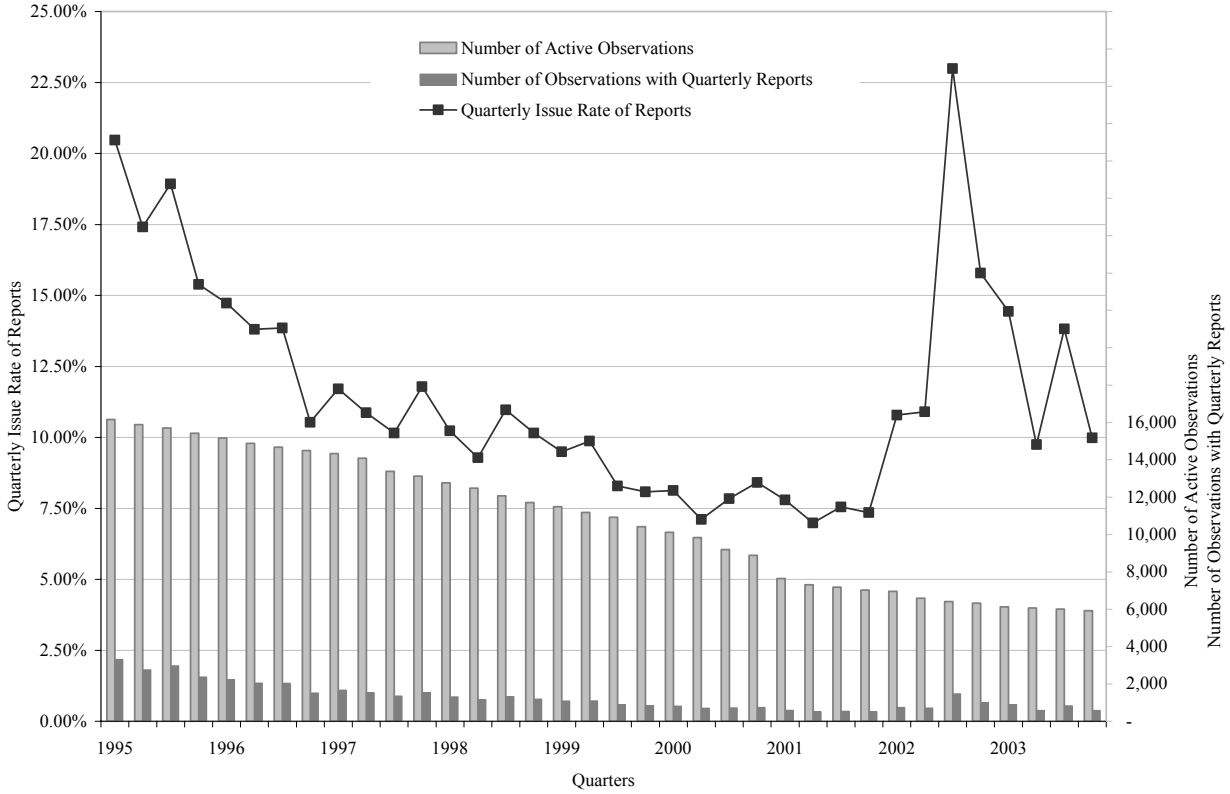
	1		2	
	Analyst Team Effects	Firm Effects	Analyst Team Effects	Firm Effects
FAVORABLE RATING$_{t-1}$ dummy [LAGGED]	-0.02 (-1.20)	-0.02 (-1.31)	--	--
FAVORABLE RATING FROM ALL-STAR ANALYST$_{t-1}$ dummy [LAGGED]	-0.00 (-0.26)	0.00 (0.08)	--	--
FAVORABLE RATING$_t$ dummy	--	--	0.00 (0.07)	0.00 (0.01)
FAVORABLE RATING FROM ALL-STAR ANALYST$_t$ dummy	--	--	0.01 (0.70)	0.02 (0.93)
CHANGE IN HOLDINGS BY ALL MUTUAL FUNDS$_t$	0.01 (12.82)	0.01 (12.62)	0.01 (5.32)	0.01 (5.43)
CHANGE IN NUMBER OF SHARES OUTSTANDING$_t$	-0.00 (-1.78)	-0.00 (-1.61)	0.00 (0.08)	0.00 (0.11)
NUMBER OF REPORTS ISSUED$_{t-1}$	-0.01 (-0.80)	-0.01 (-0.63)	0.00 (0.03)	-0.00 (-0.01)
CHANGE IN STOCK PRICE$_t$	-0.00 (-2.17)	-0.00 (-2.17)	0.00 (0.54)	0.00 (0.40)
CHANGE IN LNASSETS$_t$	0.02 (0.50)	0.02 (0.36)	-0.01 (-0.06)	-0.04 (-0.35)
CHANGE IN MARKET-BOOK VALUE RATIO$_t$	0.00 (0.13)	0.00 (0.32)	-0.01 (-0.35)	-0.01 (-0.35)
CHANGE IN EPS$_t$	-0.00 (-0.69)	-0.00 (-0.83)	-0.01 (-1.78)	-0.01 (-1.90)
CHANGE IN ASSET TURNOVER RATIO$_t$	-0.09 (-1.01)	-0.10 (-1.08)	-0.25 (-1.39)	-0.26 (-1.48)
CHANGE IN LEVERAGE RATIO$_t$	0.00 (0.09)	0.00 (0.10)	-0.00 (-0.29)	-0.00 (-0.33)
CHANGE IN ROE$_t$	0.00 (0.18)	0.00 (0.16)	0.00 (0.11)	0.00 (0.06)
CHANGE IN DIVIDEND YIELD$_t$	0.47 (0.87)	0.44 (0.82)	-0.02 (-0.03)	0.01 (0.02)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy	-0.01 (-0.99)	-0.01 (-0.95)	-0.02 (-0.86)	-0.03 (-1.19)
Wald Chi-squared	179.40	173.80	137.81	139.75
Prob > Chi-squared	0.000	0.000	0.000	0.000
Pseudo R^2	0.011	0.011	0.010	0.010
Number of Observations	15,629	15,629	15,629	15,629

Analysis time is on 36 quarters, from 1995 to 2003, with the last quarter 1994 representing time 0. The dependent variable is defined as the change in the number of shares held by an affiliated institutional investor between quarter *t*-1 and *t*. Random effects GLS are panel regressions in which the error term is decomposed in a cross-section (illustrating either analyst team or firm-related heterogeneity) and a time series component. A constant intercept is estimated but not reported. Estimation is performed by maximum likelihood. White's heteroscedasticity-adjusted *z*-statistics are in parentheses.

All covariates are time-varying variables. FAVORABLE RATING is a dummy that takes value one when the affiliated analyst issues a recommendation that is more favorable than the consensus. FAVORABLE RATING FROM ALL-STAR ANALYST is a dummy that takes value one when the analyst issuing a favorable (better-than-consensus) recommendation belongs to the All-American Research Team as selected by *Institutional Investor* magazine every October. CHANGE IN HOLDINGS BY ALL MUTUAL FUNDS measures the change between quarter t-1 and t in total percentage of the firm's equity held by institutional investors. CHANGE IN STOCK PRICE_t measures the change in the closing market price between quarter t-1 and t. All performance indicators are measured as changes between quarter t-1 and quarter t.

Figure 1

Quarterly Coverage Rate, 1995-2003

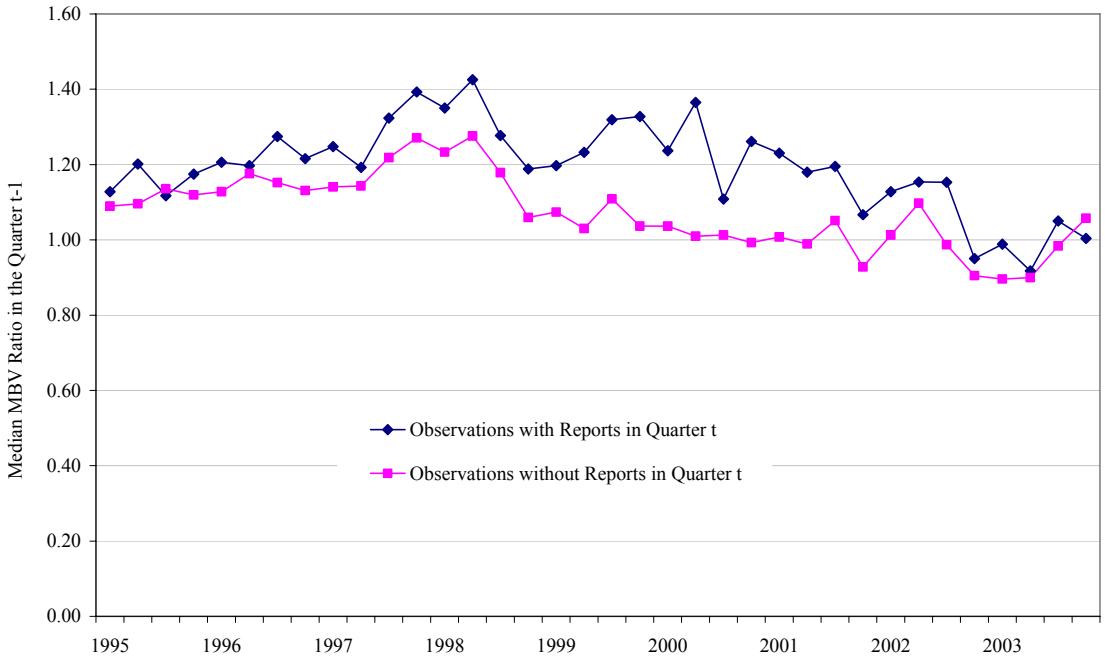


Analysis is of 36 consecutive quarters over 1995-2003. As of the end of 1994, the sample consisted of 16,824 observations constructed as pairs of analyst team i and stock j (i = 1, 2, …, 154, j = 1, 2, …, 4,121). Over time some pairs may be right-censored mainly due to concentration in the research industry and/or stock delisting. Active observations are those pairs of both active analyst teams and active stocks at the end of each quarter. Companies delisted after merger with other firms are not regarded as active. The quarterly coverage rate is determined as the total number of observations with at least one report during the quarter divided by the number of active observations at the end of that quarter. Data are from IBES and CRSP/Compustat Merged Database.

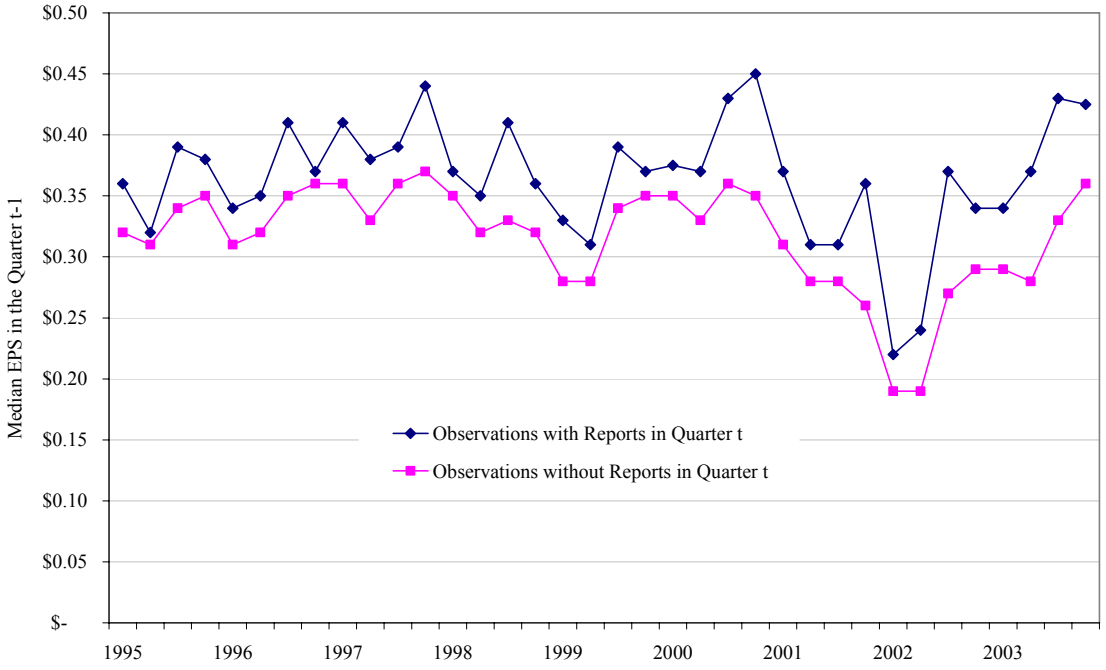
Figure 2

Performance of Stocks Receiving Quarterly Coverage

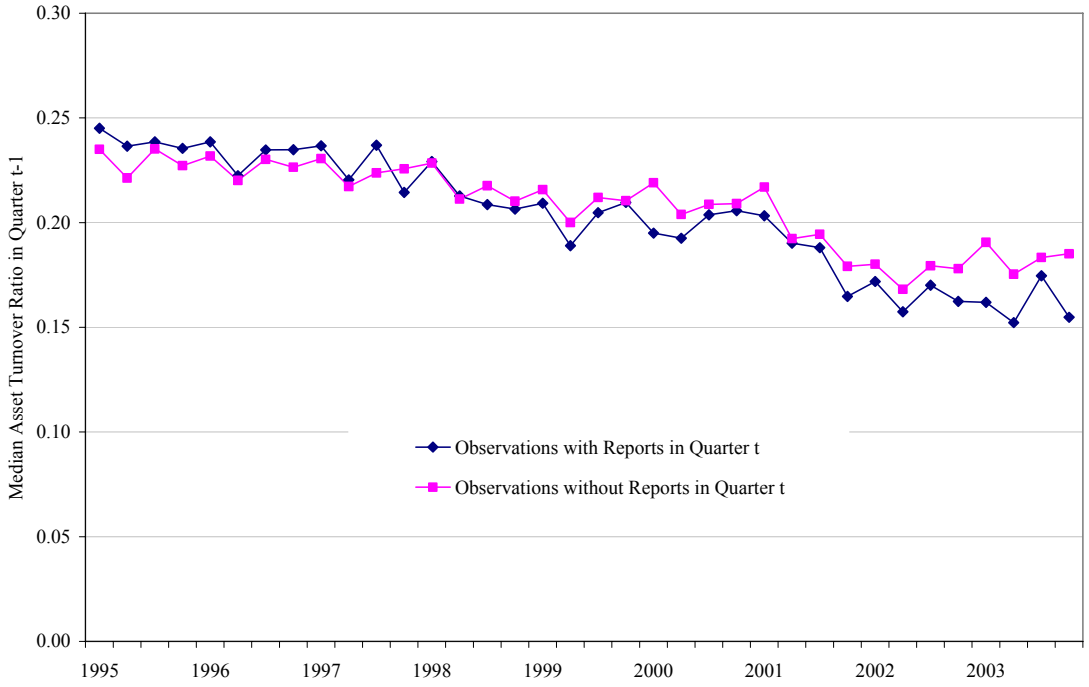
Panel A: Median Market-Book Value Ratio (MBV)



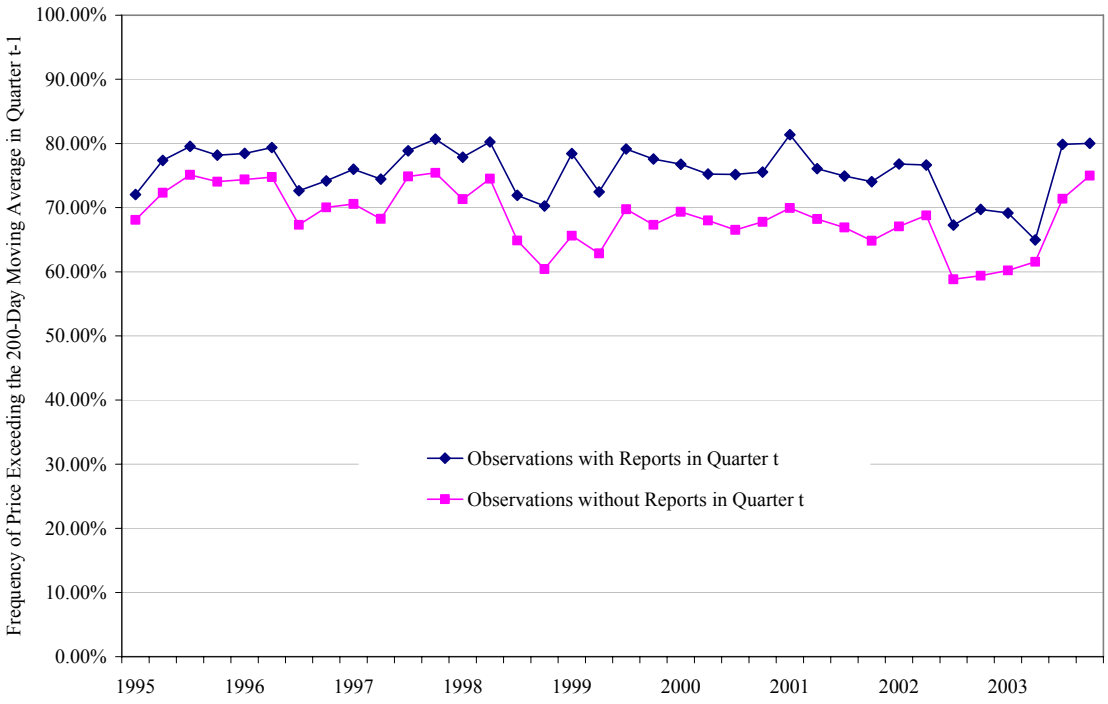
Panel B: Median Earnings per Share (EPS)



Panel C: Median Asset Turnover



Panel D: Price Exceeding the 200-Day Moving Average

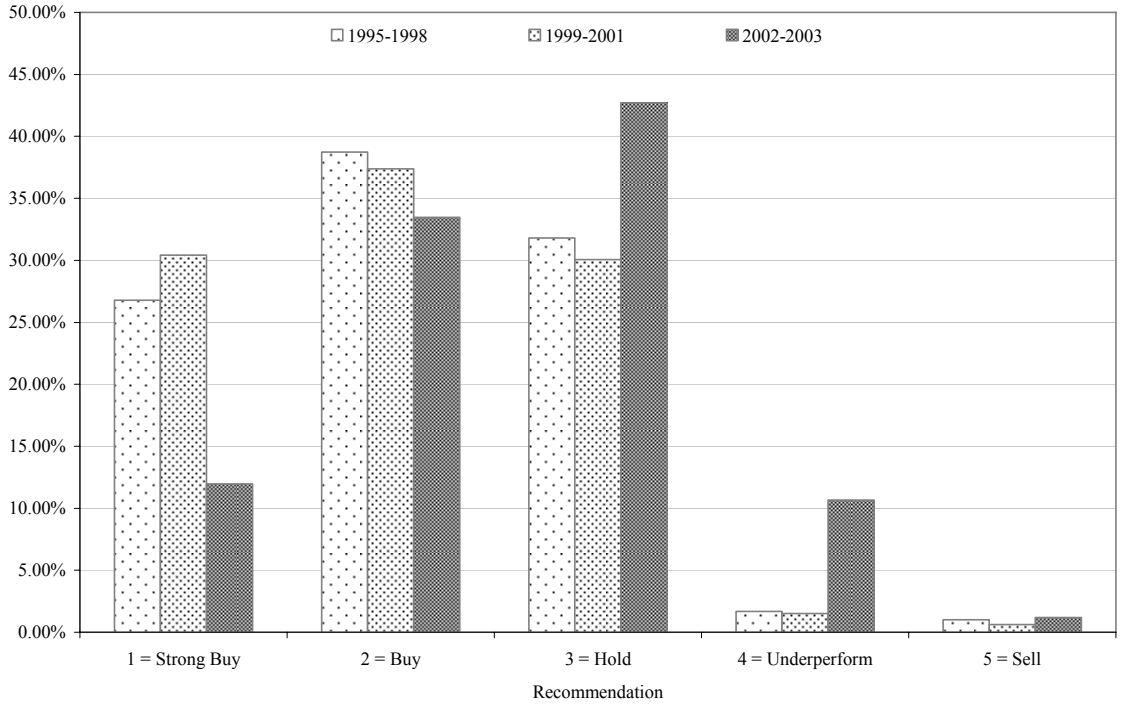


The figure accounts for the right-censoring in the initial 16,824 observations as pairs of analyst team i and stock j (i = 1, 2, …, 154, j = 1, 2, …, 4,121). In each quarter t, stock j may receive coverage from the analyst team i, but no coverage from any other analyst teams. The market-book value ratio is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by the book value of total assets. Asset turnover is defined as quarterly sales divided by total assets.

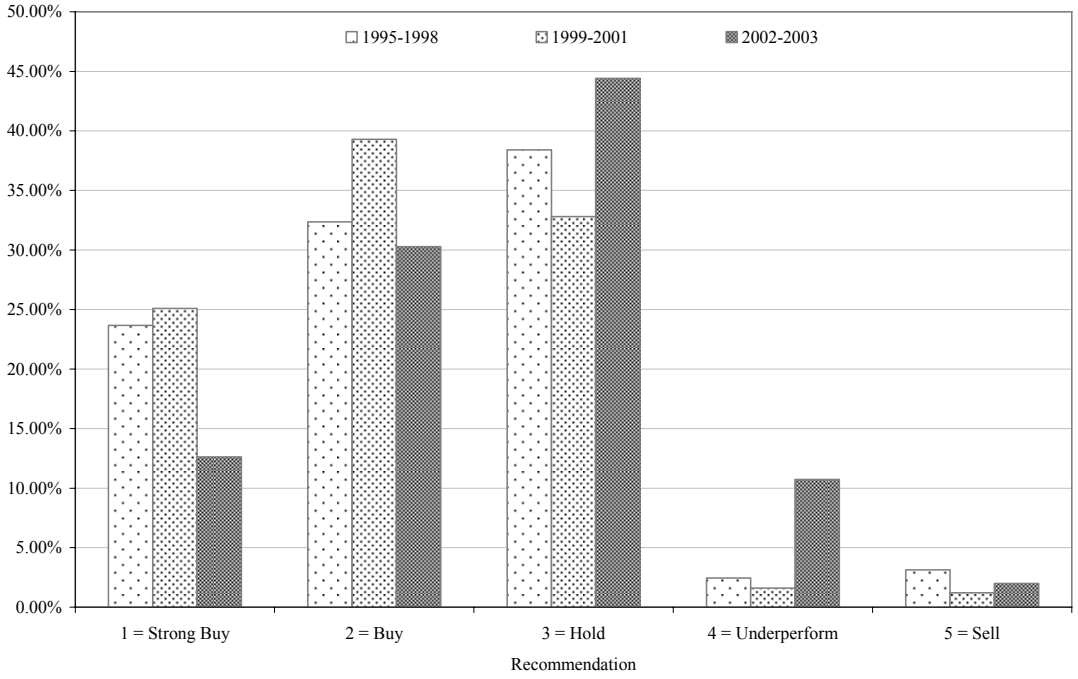
Figure 3

Distribution of Ratings by Analyst Team Affiliation and Subperiods

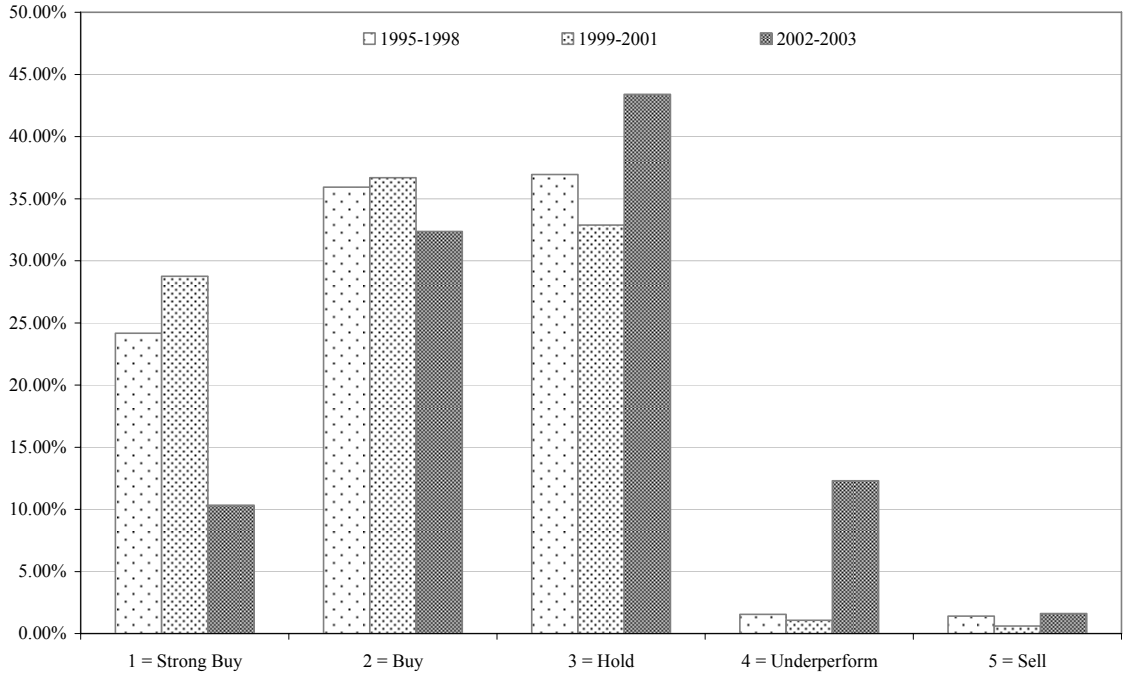
Panel A: Analyst Teams Affiliated with Investment Banks



Panel B: Analyst Teams Unaffiliated with Investment Banks



Panel C: Analyst Teams Affiliated with Mutual Funds



Panel D: Analyst Teams Unaffiliated with Mutual Funds